

Mining

CONGRESS JOURNAL



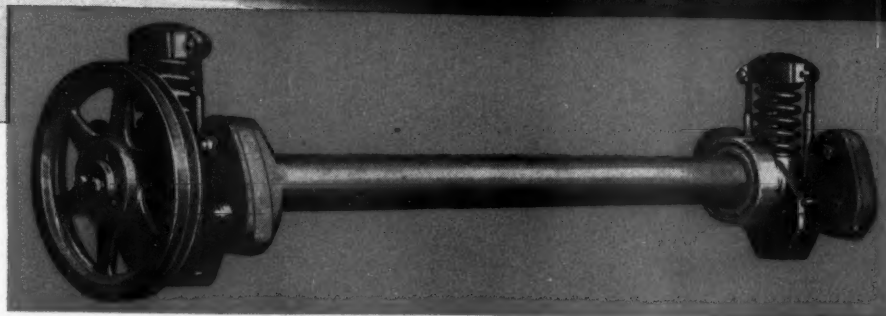
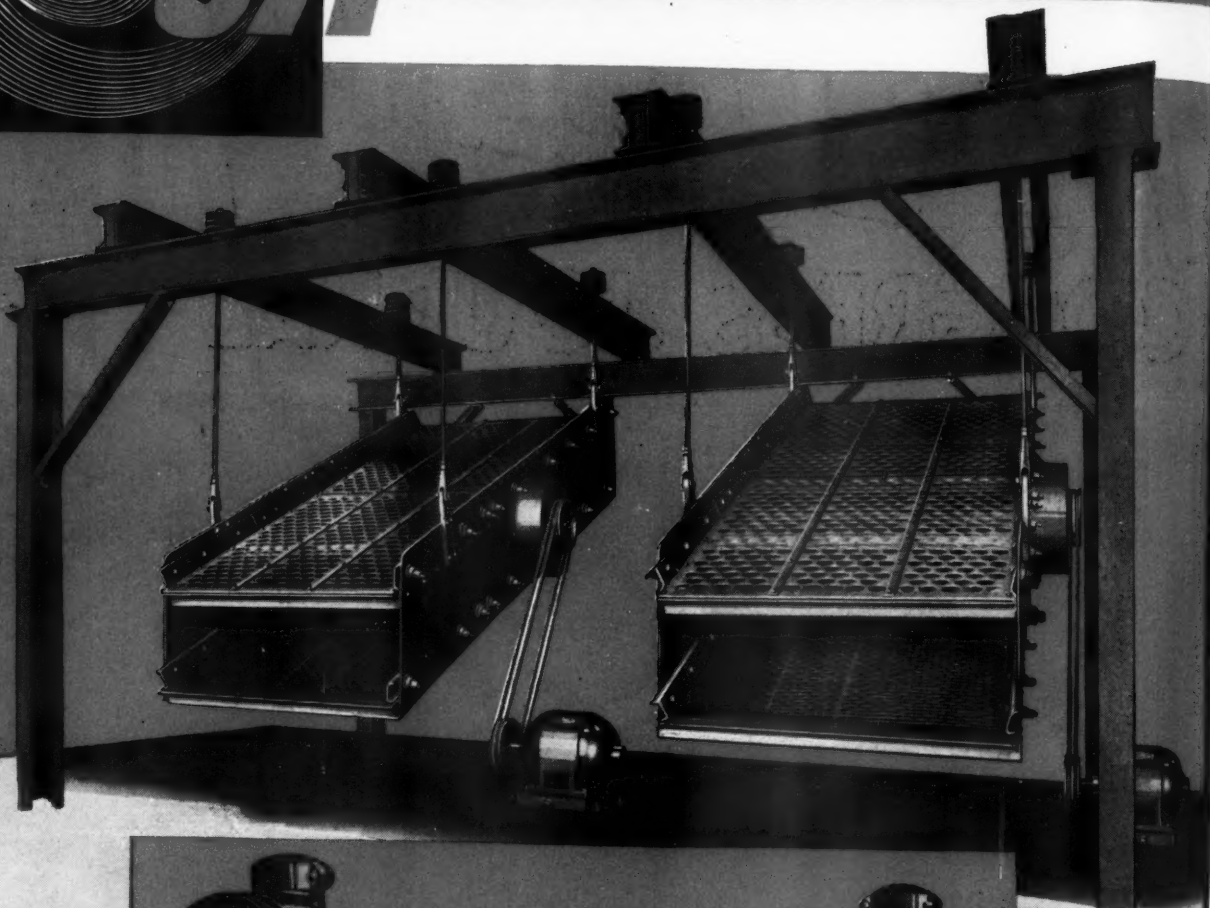
JULY
1948





LINK-BELT

concentric action vibrating screen



Upper illustration shows dual double-deck "CA" cable suspended concentric action vibrating screens, with typical steel supporting structure. At left: "CA" screen vibrator mechanism showing details of centrifugally actuated counterweights.

THE heart of the "CA" screen is the Link-Belt two-bearing vibrator. Located near the center of gravity of the screen box, this ingenious and highly effective unit imparts a smooth, positive, circular motion to all screening surfaces.

Automatic centrifugally actuated counterweights eliminate objec-

tionable vibrations usually encountered through "critical" speed ranges in accelerating and decelerating screens having fixed counterweights and large amplitudes of vibration. The high starting torques characteristic of fixed counterweights are substantially reduced by the automatic counterweight mechanism. Send for Book No. 2154.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

11,000

COAL PREPARATION AND HANDLING EQUIPMENT

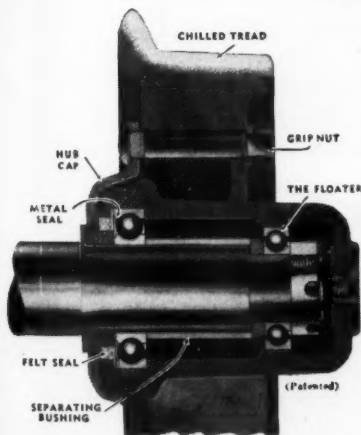
**Engineered,
Built and Backed by**



LINK-BELT



YOU CAN'T SIDE-STEP KNOWN FACTS ABOUT S-D "AUTOMATIC" ADVANTAGES!



Don't overlook the advantages of
our "Floater" Ball-Bearing wheels.


If you're not using S-D "Automatic" cars . . . if you don't know the advantages of these fine cars, then check with some mines who are using them. We'll give you plenty of names. Get the facts and you'll discover that modern S-D "Automatics" are a "must" for most profitable operation. Innumerable coal operators have discovered the truth of this statement.

S-D "Automatics" are supplied with tonnage capacities to suit requirements. In the average, they last 15 to 20 years. They have extremely large capacity for equal overall dimensions. They are not wracked by end or rotary dumping. Fifty tons or more of coal can be discharged into the storage bin per minute —automatically and without labor. The coal is laid down gently in the bin, thus reducing greatly the breakage of lumps. S-D "Automatics" are now equipped with an unlatching device that operates from underneath the car. The old sideways extending latch-lever bar that gave trouble at times is no longer used. If any operator feels that he does not want to buy S-D "Automatics" on a cash basis, we will be very glad to lease them. To-day, a large percentage of our "Automatics" are being leased. The operators like to lease them. Write us for full particulars.

20 Car loads of "Automatics" from -




SANFORD-DAY IRON WORKS, Inc. • Knoxville, Tenn.

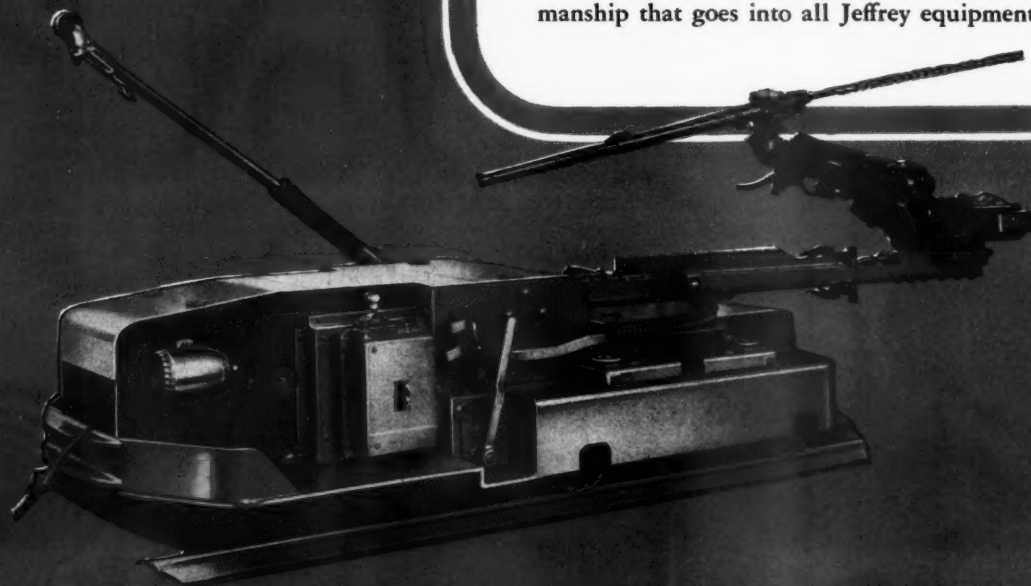


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FASTER...**

**JEFFREY 56-H
DRILLING
MACHINE**



After the design of your equipment has been approved, comes the construction. It is this phase of the Jeffrey 56-H Drilling Machine we are bringing to your attention here. Each unit is carefully machined and assembled by men thoroughly familiar with the service these machines must render underground . . . with Jeffrey standards of construction which have been built up over years of experience in designing and building mine equipment. The construction of the 56-H Drilling Machine is typical of the high quality of both parts and workmanship that goes into all Jeffrey equipment.



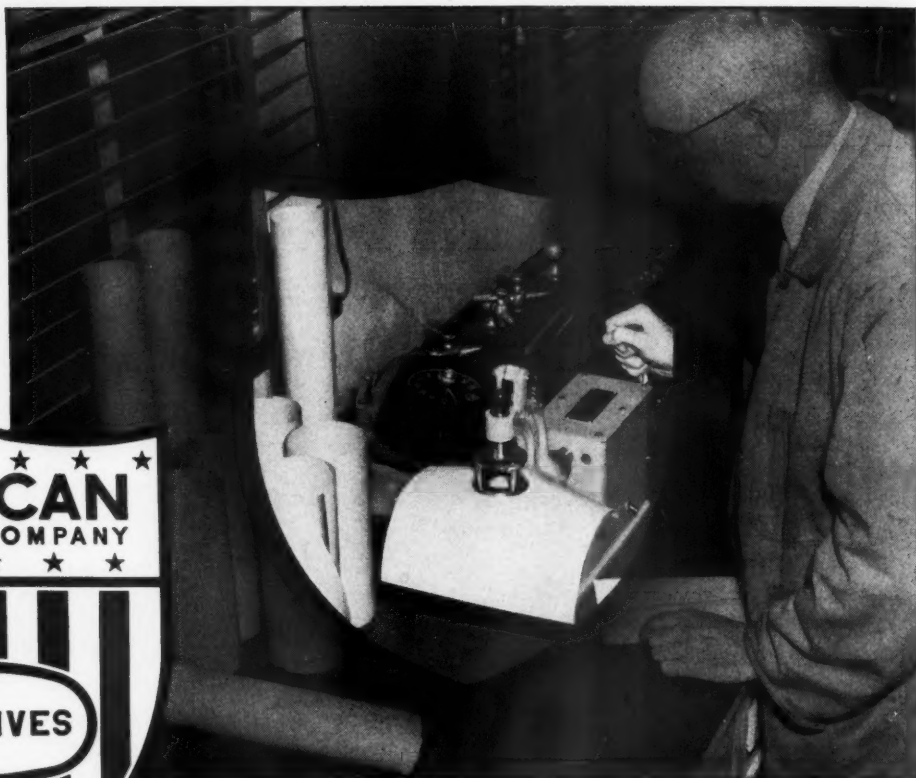


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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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GOODMAN DUCKBILL-SHAKER CONVEYORS

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DS381

Uphill shakers working on a 10% grade in anthracite.

DS367

WE

CANADA

DS3411

Wet face, gummy material, close timbering --- yet shakers proved profitable.

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250 tons per shift, close to 30 tons per man, in coal rarely exceeding 34 inches.

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Power Duckbills increase yield per man in 42 inch coal, $3\frac{1}{2}$ cuts 40 feet wide, per shift with 3 man crew.

DS4111

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WEST VIRGINIA

196,500 tons over one drive unit, $4\frac{1}{2}$ years without a replacement.

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ILLINOIS

DS407

60 tons per face man, 40 tons per man for all crews engaged --- an outstanding performance.

VIRGINIA

DS4073

Moving coal 36 to 38 feet per minute over a 250 foot pan line with a 10% grade against the load in certain places.

WEST VIRGINIA

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Too low for hand loading, too steep for mobile loaders; shaker conveyors did the job.

DS369

ALABAMA

Obtaining 60 tons per hour with uphill shakers.

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WYOMING

DS346

Over 200 Duckbill-Shakers operated by one company. Seam pitches up to 16 degrees.

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DS382

90 tons per hour with treacherous roof under cover up to 2000 feet in depth.

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2600 feet of heading and 5600 feet of rooms 56 feet wide driven with single installations without a breakdown.

ILLINOIS

DS4072

Power Duckbills load $12\frac{1}{2}$ tons per person employed at the mine including office help.

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18% slope, production of 40 tons per man. Recovery in excess of 90%.

DS407

PENNSYLVANIA

DS459

Long established name of mining valley changed to "Duckbill Hollow" two years after 1st of several shaker units installed.

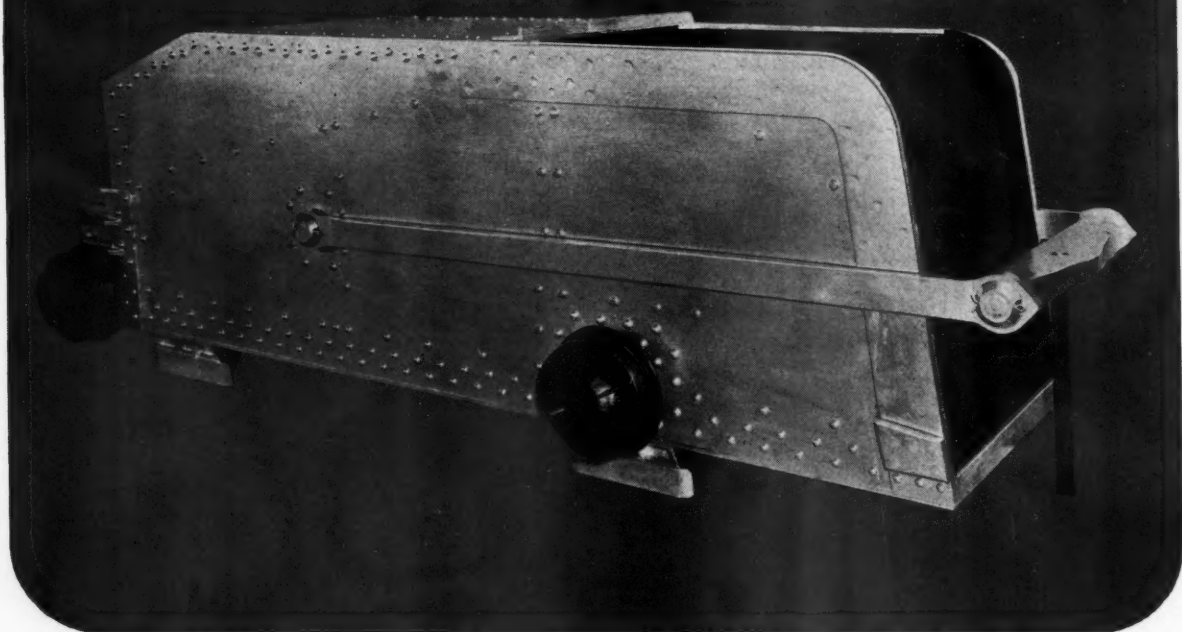
KENTUCKY

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

In England: UNITED STEEL COMPANIES, LTD.

The best way for you to determine the value of Goodman Duckbill-Shaker Conveyors in your mine is to call in a Goodman sales engineer. Without obligation, he will survey your workings and show you where and how this combined loading and transporting system can be installed and estimate the production capacity you can expect.

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Make skips and cages last longer, carry more payload. Spend less on maintenance . . . build them of Alcoa Aluminum Structural Shapes, Sheet, and Plate.

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Although aluminum is not immediately available from all sources, now is the time to do your planning and designing. Now is the time to put your weightsaving problems on the board.

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The new, revised booklet "Alcoa Aluminum and Its Alloys" will be sent to you promptly on request.



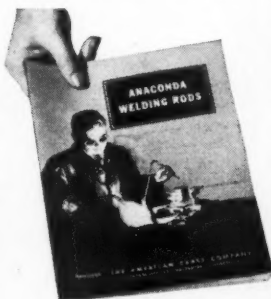
ALCOA ALUMINUM





Build up worn surfaces quickly ... at a fraction of replacement cost

Here's the answer to
how, when and why...



The American Brass Company pioneered in the development of Bronze Welding and has a suitable rod for many oxy-acetylene and arc welding purposes. Anaconda Publication B-13 describes these rods and suggests procedures for their use. A copy is yours for the asking.

It's hard to imagine any kind of industrial equipment taking a worse beating than a spiral feed screw. Under tons of wet coal or in a hot ash pit, corrosive and abrasive action are ever-present. To a well known mid-western railroad shop, continual replacement because of worn outer edges proved not only too expensive but unnecessary. Bronze Surfacing was found to be fast—and far more economical.

Welding rods such as "997" Low-Fuming and Tobin Bronze* are extensively used with the oxy-acetylene torch to deposit high strength, dense and tough weld metal on cast iron, malleable iron, steel and copper alloys. By this building-up process many shops are daily saving countless dollars by reclaiming worn parts and industrial equipment:—Sheaves, pulleys, bushings and bearings, pistons, impellers and pump parts, stripped threads and broken gear teeth, thrust plates, hubs, flanges, parts machined undersize, etc.

In addition, low temperature Bronze Welding offers a ready means of repairing broken or fractured production equipment and machine tools. Next time, "Don't Scrap It—Bronze Weld It!"

*Reg. U. S. Pat. Off.

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General Offices: Waterbury 88, Connecticut • Subsidiary of Anaconda Copper Mining Company
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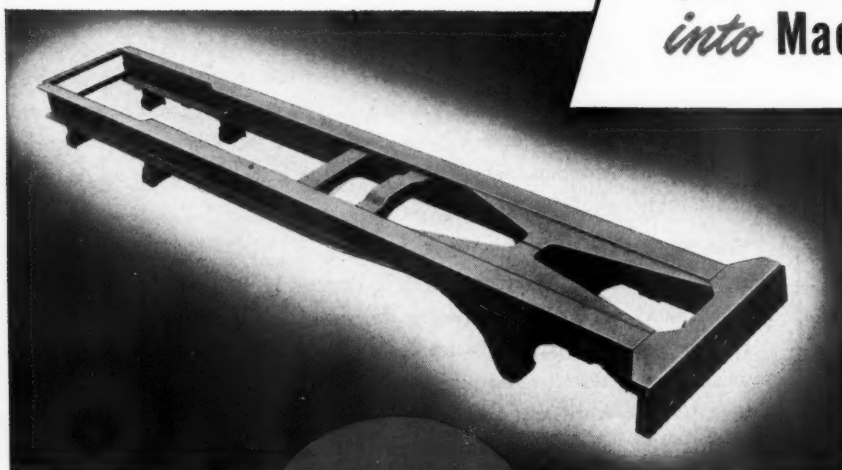
Anaconda Bronze Welding Rods



30-Ton Payloads are hauled with unfaltering ease over the toughest terrain on Mack's Model LRSW. There's abundant power in its 275 h.p. diesel engine. Positive traction because of its Balanced Bogie and exclusive Power Divider. Safe and sure control through hydraulic power steering, air-assisted clutch, air-actuated brakes, short turning radius and offset driver's seat.

You get
more work *out of*
Mack Trucks

because...we
put more work
into Macks



Massive ruggedness, unrivalled in the truck field, stands clearly revealed in the Model LRSW frame. Electrically welded into one piece, it combines brawny cross members, ample gusseting, and huge reinforced I-beam side members of alloy steel, 13-11/16" deep with 8" flange.

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trucks for every purpose



6598

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cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Ask yourself two questions

- 1 Have you need for modern coal mining "know how"—can you use new operating ideas, helpful hints on increased efficiency and lower costs?
- 2 Would you like to have one big package of this "know how"—a handy book edited by leading coal mining men, well illustrated and arranged for easy use?

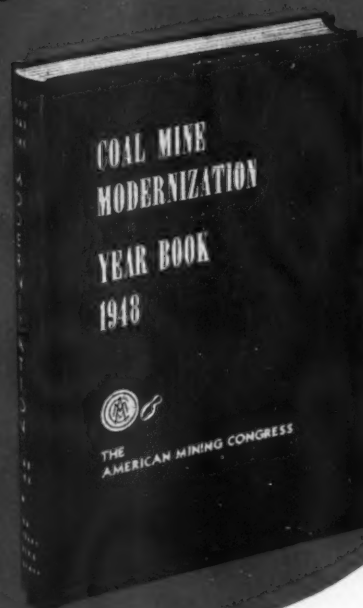
If your answers are YES, then we strongly recommend the 1948 COAL MINE MODERNIZATION YEAR BOOK.

The Year Book brings you the full proceedings of the 1948 Coal Convention—coal mining's annual forum on the latest developments in operating methods and equipment. It is the composite work of able executives, engineers and operating officials. Each has been selected by an industry-wide committee of mining men and manufacturers to discuss an important phase of coal mining at the Convention.

You get the best thought of the day on mining problems—information that you and your associates can put to work on the job. This isn't a story book! It's a fact-studded volume—prepared just for you—*practical and useful.*

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COAL MINE MODERNIZATION *Year Book*

Published by The American Mining Congress
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THE BEGINNING OF A LASTING FRIENDSHIP



Nothing makes a bigger hit with runners than equipment that combines easier handling with fast, positive action. Make sure they get it — and they'll cut costs for you on every shift!

Take this new Blue Brute Stoper, for example — the self-rotating WR-31. Note how the holding handle is placed above the center of gravity, for better balance. Then, there's the shielded, down-directed exhaust . . . and the constant air stream that keeps sludge and water out of the shielded chuck . . . additional features that get a runner's enthusiastic OK!

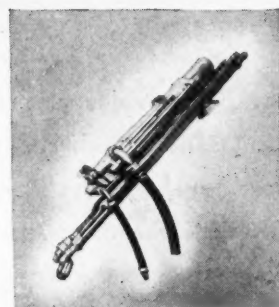
Built throughout for continuous heavy duty, the WR-31 is packed with

design improvements. Like the ratcheted rifle bar's engagement of four air-operated pawls on the piston's backstroke . . . a typical Worthington "exclusive" for fast, trouble-free drilling.

Let an on-the-job demonstration prove to you that *there's more worth in a Blue Brute*. Get your runners' verdict on the WR-31's ease of handling . . . and see for yourself how much cleaner and faster they can cut away footage.

Write for literature describing the complete line of **BLUE BRUTE Mining Equipment**, including *Drifters, Stoppers and Hand-Held Drills*.

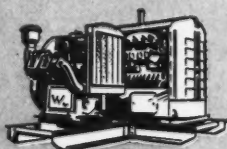
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BLUE BRUTE DRIFTERS

Types WPM (Pneu-Motor incorporated in Drifter), WPMS (Pneu-Motor on Shell), and WHC (Hand Crank). Featuring the new, *balanced* design for faster drilling cycles and all-around operating economy.

BUY BLUE BRUTES



Semi-Portable Compressors. Drifters with Feed Motor Incorporated. Drifters with Feed Motor on Shell. Hand-Crank Drifters. Stoppers. Hand-Held Rock Drills.

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take

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every time!

ACTUAL ON-THE-JOB COMPARISONS in mines all over the country prove that Tiger Brand Excellay Preformed is stronger, tougher, safer and easier to handle than non-preformed wire rope.

Made to close tolerances and unvarying quality standards from the finest quality steel wire, U-S-S American Tiger Brand Excellay Wire Rope offers the highest resistance to bending fatigue, and has the stamina to provide long service under the toughest mining conditions—advantages which help reduce maintenance and rope replacement costs. Another big advantage in rigging up with Tiger

Brand is that the services of expert wire rope engineers are available without cost at your mine to help you determine the right rope for your needs ... and to help you solve out-of-the-ordinary problems. Is it any wonder that the Big Demand is for Tiger Brand!

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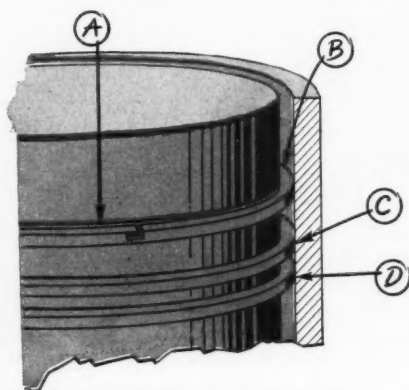


**AMERICAN TIGER BRAND
WIRE ROPE**

UNITED STATES STEEL



CASE D119A--MAINTAINING FULL POWER IN DIESEL ENGINES.



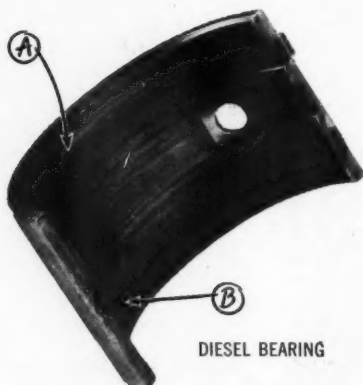
SECTION OF DIESEL ENGINE PISTON

Operators of Diesels in all types of service report RPM DELO Diesel Engine Lubricating Oil materially reduces power loss in three ways:

- A. Detergent compounds prevent ring-sticking, allow full ring tension against cylinder wall, and this minimizes compression loss.
- B. Metal-adhesion additive keeps full oil film on hot upper cylinder walls. These danger areas are often left unprotected by many oils.
- C. RPM DELO Oil maintains a tough oil seal that stops blow-by of combustion gases.
- D. An anti-oxidant increases the inherent stability of RPM DELO Oil's selected base stocks and resists lacquer formations on liners and piston skirts.

Other additives in this pioneer compounded oil prevent foaming, and control gum formations.

CASE D119B--PREVENTING FREQUENT BEARING REPLACEMENT DUE TO CORROSION.



DIESEL BEARING

In normal operation, Diesel engines require excess oxygen and operate at high temperatures. Under these conditions many unstable lubricants tend to turn corrosive and attack the lead in the copper-lead structure of alloy bearings. RPM DELO Diesel Engine Lubricating Oil is especially compounded to prevent this cause of bearing failure.

- A. Selected base stocks are used that are naturally resistant to oxidation, the cause of most bearing corrosion.
- B. Anti-oxidation compounds in RPM DELO Oil further reduce the danger of corrosion.

In laboratory corrosion tests, copper-lead bearing strips immersed in RPM DELO Diesel Engine Lubricating Oil showed considerably less weight loss than those protected by similar type oils.

For additional information and the name of your nearest Distributor, write
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 OF CALIFORNIA**

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The California Oil Company
 30 Rockefeller Plaza, New York 20, N. Y.

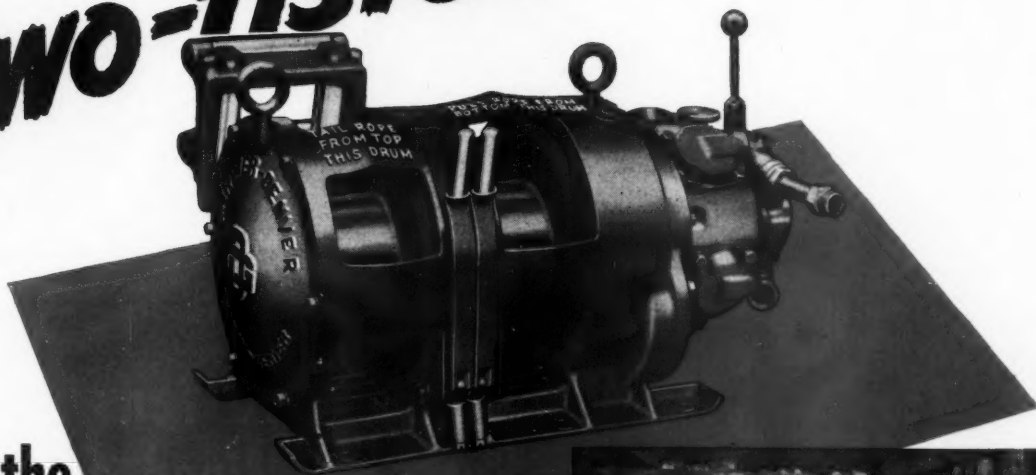
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 17th and Stout Streets, Denver 1, Colo.

Standard Oil Company of Texas
 El Paso, Texas



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two-fisted slushing power . .



at the
touch of a finger!



That's what you get when you operate the powerful Gardner-Denver Airslusher. For a *single* throttle lever controls slusher speed and direction—automatically returns to neutral when released—operates so easily it can be moved with only two fingers!

This simple lever operates an extremely high torque five-cylinder radial air motor that assures greater crowding even at low speeds; develops maximum power in either direction; operates only when doing useful work—saving air and prolonging motor life. Why not ask for a demonstration? Or, write Gardner-Denver Company, Quincy, Illinois.



• **EASY TO TRANSPORT**—compactly built, light in weight, it is easy to move through small raises and chutes.

• **SIMPLICITY OF TRANSMISSION**—compared to planetary transmissions, the Airslusher has one-third the number of gears—bearings—oil seals—lubrication points.

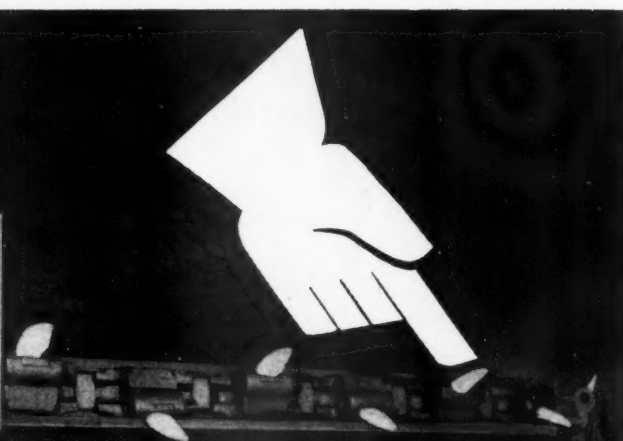
• **COMPLETE PROTECTION OF WORKING PARTS**—lubricant is sealed in—water and dirt are sealed out.

• **NO CLUTCH FACING TO WEAR**—roller clutch automatically engages one drum, releases the other, as the throttle is reversed—nothing to adjust or lubricate.



GARDNER-DENVER SINCE 1859

For complete information, write Gardner-Denver Company, Quincy, Illinois



One Set Cuts 577 Places... ... 13,986 Tons of Coal Mined and the Bits are Still Good for More Cutting.



The Hardest Metal Used in Mining...

Kennametal is a tough, durable tool material that has the high hardness of 9.2 on the MHO scale as compared with the diamond's hardness of 10. Kennametal is very much harder than the hardest tool steel. In fact, Kennametal is used, by the metal-cutting industry throughout the world, to machine hardened steel. Its characteristic hardness, combined with superior compressive strength, enables it to withstand shock, resist abrasion, and take more punishment than any other tool material.

That's the performance recorded for one set of Kennametal cutting machine bits in an Ohio mine. "The bits have been resharpener five times," reports the mine superintendent, "and they are still good for plenty of cutting."

"Still good for plenty of cutting"—is what hundreds of users report, after Kennametal Bits have cut 25, 30, or 40 more places than steel bits. The ability of Kennametal Bits to stay sharp long after steel bits dull, has these important advantages:

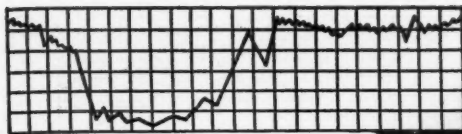
- Bit cost per ton is reduced.
- Time and labor required for changing and spotting bits is minimized.
- Bit sharpening expense is lowered.
- Down time of cutting machine is lessened.
- Mining machine maintenance is reduced.
- Power consumption is from 10% to 50% less.
- The coal face is cut faster per place and at a constant rate.
- In 7 out of 10 cases cuttings are coarser, and there is less dust.
- Loaders and hauling equipment are kept busy.
- Tonnage per shift is increased.

Kennametal Bits are priced between 95¢ and \$1.40 each, depending upon size and quantity. At this price they are by far the most economical tools you can put in the chain, when you measure their cost against the savings they effect in materials, labor, power, and maintenance... and the increase in over-all mining efficiency.

Write, asking for a demonstration. Mining Division, Kennametal Inc., Latrobe, Pennsylvania.

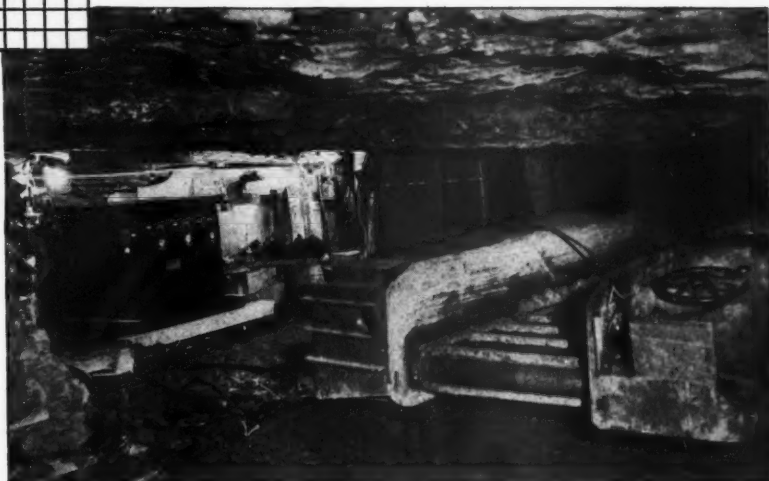
KENNAMETAL

THE WORLD'S LARGEST MANUFACTURER OF CEMENTED CARBIDE MINING TOOLS



OFF-PEAK POWER

keeps them
CHARGED



SIX OR SEVEN hours of charging per day during the off-peak period... that's normally time enough for full recharge of the batteries that operate your mine haulage equipment—*provided they are EDISON Nickel-Iron-Alkaline Batteries.* The reason: EDISON Batteries can be charged day after day at an average of their normal rate without injury.

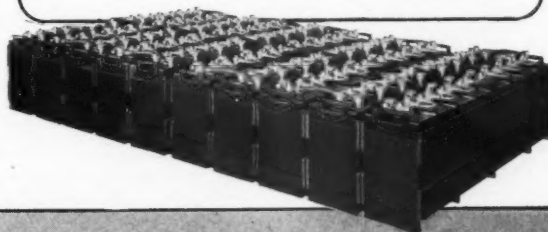
In addition, they require no critical adjustment of the charge rates. That means that you can charge them directly from the d-c power lines through suitable resistors.

EDISON Nickel-Iron-Alkaline Batteries have many other built-in advantages: their rugged steel construction inside and out withstands rough usage; their electrolyte, an alkaline solution, is a natural preservative of steel; their electrochemical principle of operation is free from self-destructive reactions. That's why they stay on the job, out of the repair shop. That's why they cut annual operating cost and give longer service life than any other type of battery.

Specify EDISON and you specify maximum reliability—enduring quality.

In Mine Locomotives and Shuttle Cars EDISON Nickel-Iron-Alkaline Batteries Give You These Important Advantages

- ★ They are **durable mechanically**; grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.
- ★ They are **foolproof electrically**; are not injured by short-circuiting, reverse charging or similar accidents; are free from self-deteriorating reactions.
- ★ They can be **charged rapidly**; do not require critical adjustment of charge rates; can be charged directly from mine d-c supply.
- ★ They **withstand temperature extremes**; are free from freezing hazard; are easily ventilated for rapid cooling.
- ★ They can **stand idle indefinitely** without injury, without attention, and without expense.
- ★ They are **simple and easy to maintain**.



EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON
STORAGE BATTERY DIVISION
of Thomas A. Edison, Incorporated
West Orange, N. J.

IN CANADA: International Equipment Co., Ltd., Montreal and Toronto

• Core Drill For Values

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Write for Bulletin No. 57

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IMPORTANT new designs and improvements are rarely the results of good luck; most of them come the hard way, from intensive research by skilled engineers working with ample facilities and a thorough knowledge of the field. That's especially true of mining shovel design, where so much depends on constant close contact with current field problems, on engineers with the "know how" to develop practical ways to solve those problems, on manufacturing facilities extensive enough to

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W I S C O N S I N

★ Mining ★

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Too Much "Santa Claus"

AID to relieve Western Europe's basic needs is a requirement that must be filled by the people of the United States through personal contributions and their portions of taxes paid. But there is a limit to the amounts of aid that we can give without seriously hurting our own economic health and the moral strength of those on the receiving end.

Gifts have a way of undermining the character of those who continue to accept them to a point where their will and wish to fend for themselves wither. Recognizing that we must give aid, we must also be ever aware that our help must not tip the scales to diminish the desire and ability of the peoples of Western Europe to rebuild their industries and put their economies on a self-sufficient basis at the earliest possible time.

If our gifts, credits, and loans fail in their objective of bringing the people of Western Europe to a point where they can and will accept their group responsibilities, then we have been party to the theft of many of the rights of people living on both sides of the Atlantic.

The Loophole

LLOUD noises are still heard against the Taft-Hartley Act that returned to workers many of the rights that had been shorn from them by union leaders. At the same time that union officials wail to the press, busy staffs of professional legal-loophole finders seek an "out" whereby labor leaders may regain more of the great powers they held prior to enactment of the law.

The Taft-Hartley law has been good for labor and for all the people. It has brought democracy to the labor movement. Many strikes and walkouts have been prevented and even John L. Lewis has responded to the curb bit, although he continues to champ. Through his fight against the law he endears himself to the Communists even though he tosses them out of his union as soon as they are revealed.

President Truman, despite his veto and his continued opposition to the Taft-Hartley Act, called upon its powers to restrain the threatened maritime strike last month. Without this law, we might be subject to the disastrous results of coal, rail, and maritime strikes taking place simultaneously. The law has curbed many of the abuses and irresponsible activities of certain segments of labor. It has effected some control over Communists in labor unions and has served to restrain unprincipled union officials who were heedless of the public welfare.

As Senator Edward Martin pointed out in a courageous address to the Pennsylvania Federation of Labor, the basic rights of union members remain unchanged, and labor is still protected in its right to organize, to bargain collectively, and to strike, unless the greater right—the health and safety of all the people—is endangered.

But the immunity granted to labor unions under the Clayton and Norris-LaGuardia Acts has fostered the growth of unions into the most complete monopolies that ever hampered the free action of this country's economic system. Exercising immense power over all the employees in the coal industry, for example, the UMWA has forced coal production to a standstill time and again. Rail and railway express strikes have frozen the distribution of food and fuel and halted production in many fields. Trade and commerce have been restrained by these giant labor monopolies without consideration of the public welfare. Large groups of people have been subjected to unusual and unnecessary hardships.

In a forceful address to the Third National Conference on Citizenship, Donald Richberg described unions as "... the most conspicuous and effective monopolists regulating production costs, and thereby selling prices." He stated that labor leaders are blinded by self-interest and predicted, "If these (monopolistic powers) are not destroyed, they will in the end themselves destroy a competitive economy which is the only economic system in which labor can be free."

For 60 years employers have been restrained by law from monopolistic practices. Similar legislation to restrain labor from repeating the tactics which have crippled our economy so frequently has been urged from many quarters. Appeasement or Government seizure and ultimate capitulation to arbitrary demands has been the principal remedy to date. The Taft-Hartley Act's 80-day injunctive provisions are cumbersome and inadequate and do not go to the core of the trouble. Results under present conditions are neither fair nor just to the consuming public who must bear the brunt of increased costs and successive inflationary spurts.

If this nation is to have any assurance of freedom from industry-wide strikes that hack at the roots of free enterprise, labor unions must be made subject to laws curbing their action as powerful monopolies.

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Manpower shortage continues to curb full mine production

ANY discussion of the labor shortage in the mines of the West, and especially in the Coeur d'Alene District of northern Idaho, makes it necessary to look backward to review the beginnings of mining in this area.

Following the discovery of gold in California in 1849, the West was overrun by the hardy prospectors of the time, who covered the entire area in a few short years. They eventually reached northern Idaho and discovered gold on Prichard Creek in 1883.

This discovery precipitated a gold rush that varied from the California rush only in degree, and as the prospectors fanned out from Prichard Creek and the Murray area, they found the surface showings of lead, silver, and zinc-bearing ores that became the great producing mines of the Coeur d'Alenes. These same mines are now faced with an extremely serious labor shortage.

In those early years in the district, and in the small beginnings of the various mines, there was sufficient labor recruited from the pioneers, who were also prospectors. Every one of them was working for a grub stake with the hope that some day he, too, would make a fortunate discovery that would put him on easy street.

As the mines grew in size and required more men to operate them, the transcontinental railroads reached the West and a new labor supply began to appear. Immigrants from Central Europe and the Scandinavian countries reaching the eastern shores of

the United States usually stopped in the coal and steel producing areas of the industrial East, where labor was paid at the rate of \$1.00, or \$1.50 for a 12-hour day. In various ways they would hear of the mines in the West where \$3.00 a day for a 10-hour day was the lowest wage, and to them it looked like the pot of gold at the end of the rainbow. Numbers of these men would work their way westward, often as laborers on the railroads that were then spanning the continent, and eventually they would end up in our mines, and would find that the reported earnings of the miners were true. They in turn would send word to friends and relatives and urge more and more immigrants to join them. Thus the labor recruiting problem in large measure was taken care of by the miners themselves, and as late as 1911, approximately 80 per cent of our local mine labor consisted of Welshmen, Cornishmen, Finns, Yugoslavs, Poles, and men from the Balkan States.

This condition continued until World War I, and although the labor market was a little tight during the war years, there was no such shortage as we have today, and in the years

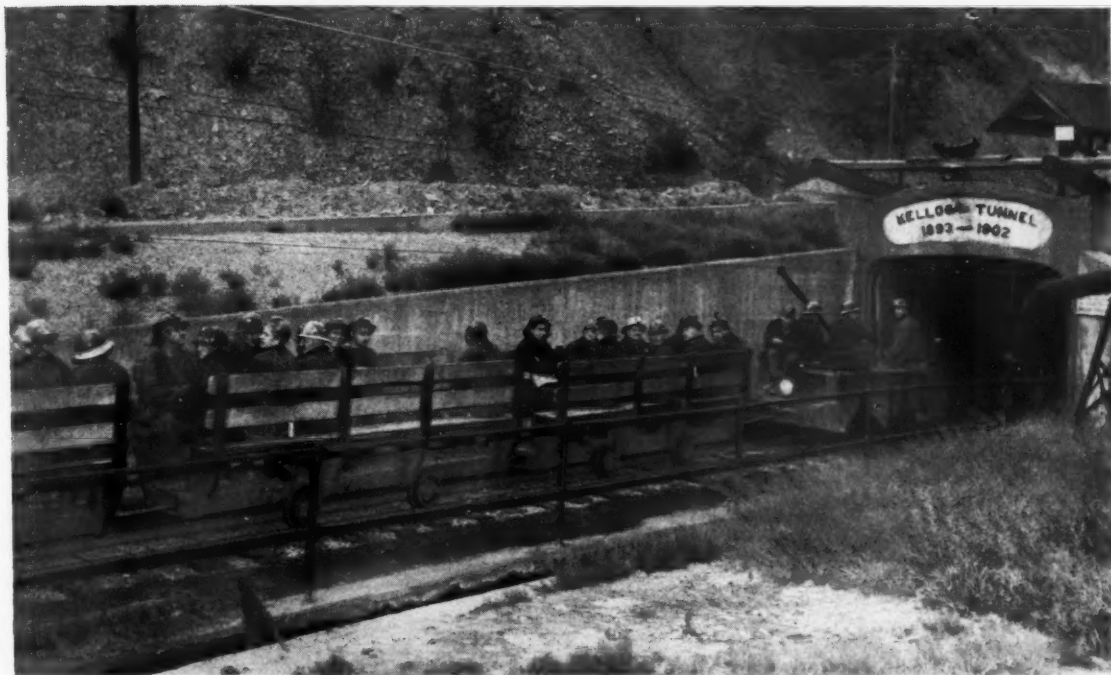
from 1920 to 1929 the labor supply was good if not plentiful. However, in 1929, after Congress passed the immigration quota law, the mine labor supply began to dwindle and rapidly became worse until the depression following the crash of 1929 and 1930.

During the depression years, crews were built up to perhaps the highest point in mine history, reaching their peak about 1937. After 1937 these crews began to shrink as the general business picture began to get brighter, and this shrinkage continued up to and including the years of World War II. During the war there was a temporary improvement due to the fact that the Army furloughed to the mines a considerable number of men, but with the ending of hostilities the drop in mine labor was sharp and sudden, and has continued to decline.

In looking back over the picture it is clear that since the turn of the century there has been a sufficient supply of mine labor *only during the periods of unrestricted immigration or during severe depressions.*

No clear-thinking citizen will ask for another depression or for unrestricted immigration. However, while the United States has been pour-

How To Improve M



Working conditions carry considerable weight in worker's choice of job

ve Mine Labor Supply

By ROY S. HOOPER

Assistant Mine Superintendent
Bunker Hill & Sullivan Milling and
Concentrating Co.

Faced with the problem of maintaining high-level production in a basic industry, management must take the initiative to make mining attractive to a limited labor supply. Here a mining executive suggests a five-point program to increase the shrinking force of miners.

ing out hundreds of millions of dollars to furnish food, clothing, and other supplies, including metals, to the poverty stricken peoples of Europe, there has accumulated, under unused immigration quotas, a back log of over 400,000 people.

While our country, and in fact the whole world, is crying for metals, and our mines are hopelessly short of manpower, it seems that it would be good common sense and a patriotic move for the mining industry to petition Congress to admit a reasonable number of men from European countries who would be willing to come here and accept work in our mines and smelters, and so help out in the production of badly needed metals.

John L. Lewis has testified before a Congressional committee that the average age of men in the soft coal

industry is 51, and although we have no comparable figures for the metal mines, all of us know that the average age is increasing rapidly. One of the most alarming facts facing the industry today is the reluctance of young men to start at the bottom and learn the skills necessary to become a good miner. This is perhaps due to many causes, but three of the causes are outstanding.

Three Reasons for Shortage

First, the mining trade has lost the romance and the glory of the early days. In the public mind mining is looked upon as a low and almost degrading kind of work and this low opinion of mining has been fostered by men in high places. Even Supreme Court Justice Murphy, who delivered the court's opinion in the *Jewell Ridge*

case, used the following language: "Those who are forced to travel in underground mines in order to earn their livelihood, are unlike the ordinary traveler or the ordinary workman on their way to work. They must journey beneath the crust of the earth, far removed from the fresh and open air and from the beneficial rays of the sun. A heavy toll is exacted from those whose lot it is to ride and walk and mine beneath the surface. From the moment they enter the portal until they leave they are subjected to constant hazards and dangers; they are left begrimed and exhausted by their continuous physical and mental exertion."

Again quoting from Justice Murphy's opinion in the *Tennessee Coal, Iron and Railroad Co.* case: "The length of the rides in the dark, moist, malodorous shafts varies in the different mines from 3000 to 12,000 ft. The miners then climb out of the skips and man-trips at the underground man-loading platforms or 'hoodlums' and continue their journeys on foot for distances up to two miles. These subterranean walks are filled with discomforts and hidden perils. The surroundings are dark and dank.

The air is increasingly warm and humid, the ventilation poor. Odors of human sewage, resulting from a complete absence of sanitary facilities, permeate the atmosphere. Rotten mine timbers add to the befouling of the air. Many of the passages are level, but others take the form of tunnels and steep grades. Water, muck, and stray pieces of ore often make the footing uncertain. Low ceilings must be ducked and moving ore skips must be avoided. Overhead, a maze of water and air pipe lines, telephone wires, and exposed high voltage electric cables and wires present ever-dangerous obstacles, especially to those transporting tools. At all times the miners are subject to the hazards of falling rocks."

In addition to such language, the public press has given wide publicity to extremely unfavorable living and sanitary conditions found in some few mines. The public accepts these descriptions as applying to all mining regardless of the kind or location. Where such conditions exist they should undoubtedly be corrected, but it is extremely unfair to have the general public look upon them as existing in all mines everywhere, where actually such conditions are the exception rather than the rule.

Second, the millions of young men who served in the Armed Forces during the war, heard all the tall tales of big money and easy jobs held by the civilians. As these young men are discharged and reenter civilian life, they are looking for the same kind of dream jobs that were held up before their eyes by the propagandists during the war.

Third, the fact that fathers who have been miners all their working lives are discouraging their sons from following in their footsteps tends to steer men away from mining. This applies not only in the United States, but according to many articles published in periodicals of national circulation, the same thing is true all over the civilized world, and it seems to be directly related to the age-old desire of parents to see their children have an easier life than has been their own.

Progressive Program Needed

This short review of the history of mine labor in this area brings us to the present time and the labor conditions that exist today. The future is anyone's guess. Discussion and controversy is needed in an effort to make the mining industry as a whole unite to try to put into effect some changes that will induce more men to take up mining as a life work.

A publicity campaign to acquaint the working population with the necessity, the importance, and the dignity of mining may do much to counteract the present widespread opinion that this occupation is undesirable and of low estate. In this connection the

commonly used term "mucker" and other uncomplimentary adjectives, to designate common labor, should be eliminated from the mining vocabulary.

Housing and recreational facilities must be increased and improved, as today every one from the president of the company to the shoveler desires modern housing and facilities, and clean, decent conditions under which to live and rear their families. Good

schools and churches are also important and help to induce the better class of men to settle in a mining community and to stay there once they are established.

Labor conditions can be improved by management's insistence that all supervisors be educated and trained in modern methods of personnel handling and in the humanities. The days of the "hard-boiled" supervisor are

(Continued on page 36)



Mechanical equipment reduces the physical work in mining



Skid mountings on drills make for easy set-ups



Hillside Stripping in West Virginia

A comprehensive explanation of the basic principles of planning and operating side-hill stripping, with particular reference to West Virginia areas.

IN the relatively small area, 24,000 square miles, encompassed by the State of West Virginia, the geological formation is such that it contains the greatest concentration of high grade bituminous coal of any area of comparable size in all the world. Nature chose this particular part of the Appalachian Plateau to stack horizontal layers of limestone, sandstone, shale and coal, one upon the other, until the total minable thickness of coal reaches fantastic proportions. At the time this structure was thrust up above the surrounding areas of the earth's crust, that portion of the plateau which is now known as West Virginia was left in a condition particularly susceptible to the ravages of erosion. Erosion wore down through the alternate layers of limestone, sandstone, shale and coal to leave behind a country intricately dissected, by extensively branching streams, into a maze of narrow canyons and steep-sided hills. The result of this is that today there exists throughout the state unmeasured thousands of miles of coal-seam outcrops. Some localized areas contain unbelievable concentrations of outcrop mileage. The recovery of coal by strip mining from such reserves was long considered impracticable, but time has altered this viewpoint to the extent that any outcrop is now regarded as a potential source of production.

Under the urgency of obtaining fuel for World War II requirements, coupled with the curtailment of general construction work, resulted in a large number of contracting firms shifting their activities to the coal mining industry for the specific purpose of producing coal from these outcrop reserves. Much of the tonnage produced by these organizations was obtained with machinery ill-adapted to the job and labor unskilled in mining methods. With the characteristic ability of construction organizations to meet ever-changing conditions, they produced a great tonnage of coal. The production thus obtained was of greater importance than its fixed monetary value; it contributed invaluable toward winning the war.

Wartime activities have proven beyond a doubt that the stripping of sharp hillside outcrops is a practical mining procedure. However, an examination of many prospective stripping operations reveals the necessity for dispelling the fallacy of thought, acquired under the stress of war conditions, that a small shovel and a couple of trucks are the requisites to a successful present-day operation in this rugged country. If sharp hillside strip mining is to be continued, then the process, as it came to be recognized during the war, must be refined so as to take full advantage



By HAROLD L. BAILEY

President
Bailey Construction Corp.

of all the technological developments and advancements available to it.

Factors Determining Success of Operations

Certain essentials must be considered in any sizable stripping project. They are presented primarily for the benefit of those who have had little or no experience with such work, in the hope that some detours and dead-ends may be eliminated from the studying and planning which they are now doing or may do in the future.

Some emphasis of the basic underlying cause for the present urge toward strip mining may provide a better understanding of the problem to be solved in effecting a successful strip-mining venture. The price of labor is at an all-time high with the result that the widest differential on record exists, in terms of purchased energy, between the cost of man-

power and other forms of power such as electric, Diesel, and explosive. The relationship to each other in terms of cost per horsepower hour approximates these ratios: If the cost of electric energy is taken to be unity or one, then Diesel energy would cost from one to three times as much; explosive energy 10 to 20 times as much; and human energy 5000 to 25,000 times as much. As a producer of energy, man is hopelessly outclassed. Because of this, the greatest problem confronting the coal-mining industry is the elevation of an ever-greater percentage of its personnel to positions of operators of facilities utilizing the various forms of low-cost energy. Due to the availability of outcrop reserves, low-cost energy, machines and personnel the strip mining of coal fits into this present day industry problem. These elements can be combined now in a manner to utilize greater quantities of low-cost energy and lesser quantities of high-cost energy than any other method of mining to effect the low-cost production of salable products. This, therefore, is the basic reason for the present intense interest in strip mining.

This method of mining offers no over-all solution to the major problem of the industry, although some stop-gap aid is being, and will be provided while better and better means are being developed for use underground of the various forms of low-cost energy. The chief advantage of the strip method of mining lies in the immediate opportunity it presents to companies or individuals, able to take advantage of its great possibilities. For those having control of a sizable acreage of land containing coal seams outcropping above water level, a potential strip mining opportunity exists which is worthy of careful consideration, examination, and study.

At the inception of a project the best procedure for those with limited experience to adopt is to engage competent consultants to assist in giving organized direction toward solution of the problem. A qualified consultant will provide guidance in the following general considerations: Outlining the detailed engineering which will be required; estimating the possible reserve to be recovered; the daily and monthly volume which such a reserve should support; a general idea of the equipment which will be required; the general problem of financing the operation; and the best manner of approaching the actual execution of the job. Such a study of prospective stripping projects will cause the abandonment of undesirable jobs with a resultant saving of effort and money. The consideration given to projects deemed worthy of detailed study will provide an outline of the problem showing all the steps incident to de-

veloping them into economic producers.

Due to the speed at which strip-mining operations progress, serious mistakes may easily be made. Consequently, the detailed engineering must be sound, adequate, and timely or mistakes may be made which could carry through the entire life of the job. Operations have been known to dig themselves into positions where no further movement of the shovels could take place and these errors lived through the life of the jobs. The detailed engineering had not kept pace with the rapid advance of the operations.

If, as is the case in many West Virginia areas, several seams outcrop on a property, one should determine, first of all, their location elevation-wise. The best manner to determine the general position of the minable seams is to diamond drill the property at a few strategic locations to obtain cores from the highest elevation through the lowest seam above water level. This will give some indication of the thickness of the seams, their position with respect to each other, and the character of the overburden. It will also indicate the order of stripping the various seams; some may lie so close together that the stripping operation must progress upward from a lower seam to the next higher so that the spoil from one seam will not interfere with another, as would be the case in a downward progression. You may think, "This is obvious to all," but the examination of dozens of stripping prospects revealed that only one had this required data.

The prevailing idea, in connection

with diamond drilling, that a few cores will provide adequate information for a stripping project, is erroneous. Diamond drill cores are indispensable in obtaining general data but if relied upon, solely, the results will be inadequate, often misleading, and in some cases disastrous. About 50 per cent of the considerable diamond drill footage used personally through the years has resulted in misdirection. Attempting to peer below the surface, through the medium of diamond drill cores, at a few isolated spots on a sizable property and using the general information thus obtained to arrive at detailed conclusions, can only result in confusion, wasted effort and, in extreme cases, disaster to a project.

Coal Quality Must Be Known

Once the sequence of the seams has been determined, outcrop openings on the seams selected for further examination should be made at regular intervals to provide the necessary detail information. If the seam is uniform in thickness, one opening to every mile of outcrop should be sufficient; but if it is irregular, openings every 1000 ft may be required. All openings should be carried through the oxidation zone so that the distance from the surface in to the start of merchantable coal may be accurately measured. This measurement is important as it affects all the tonnage and overburden-ratio calculations. When firm coal is reached, the seam should be faced up, measured accurately for thickness, and carefully sampled. The sampling should be done not only to determine the usual



A typical operation in the hills of northern West Virginia

coal analysis characteristics but also to ascertain whether the oxidation zone has been passed. The index number of the coke button obtained from the sampling is a good indication to the degree of oxidation present. If a coke button cannot be obtained, the sample is fully oxidized and the opening will have to be driven in further to reach merchantable coal.

If future trouble is to be avoided, the quality of the stripping reserve must be accurately determined. The usual analysis elements of ash, volatile, fixed carbon, sulphur and ash-softening temperature must be definitely known; and such items as moisture and oxidation must be given special attention. If the moisture content of the coal is high, its marketability may be limited; if the oxidation content is high, the product may be unmarketable. It is questionable if bands of impurities, under six inches in thickness, may be successfully removed from a seam except through washing plant preparation. The presence, in volume, of clay veins, horsebacks, and localized disturbances may necessitate washing-plant preparation of the product or cause abandonment of the stripping operation. The question of quality should be satisfactorily answered before making additional expenditures.

Previous reference has been made to the fallacy of the prevailing thought that a few diamond-drill cores on a sizable property could give adequate information as to the character of the overburden. Such cores may not provide sufficient information in determining the overburden drilling method and shooting cost estimate. Since it is imperative to know whether the strata immediately over the coal seam lends itself to horizontal or vertical drilling, additional information may be secured by carrying the openings back to the solid overlying strata. In the event heavy sandstone or limestone comes down immediately on the coal, vertical drilling will probably be required; whereas, if three or more feet of shale or soft strata overlies the coal, horizontal drilling is indicated. On West Virginia's sharp hillsides, the cost of vertical drilling, per cubic yard, is considerably greater than that of horizontal drilling.

Map Contours Accurately

Adequate contour maps should be available. Maps showing accurate contours at 20-ft intervals are good, but those having 5-ft intervals are superior. The finest of such maps, guaranteed as to accuracy, may be procured from responsible aerial surveying companies for as little as \$1.50 per acre. Attempting to lay out jobs ranging in size from 1,000,000 to 25,000,000 tons without such basic data, when it is available at so little cost, seems sheer folly. Those studying

sizable prospective stripping operations cannot be urged too strongly to have the stripping area contour mapped to at least 10-ft intervals. With such map data, plus the information obtained from outcrop openings, all the detailed dimensions are available for determining the coal reserve in tons, and the overburden ratio. Through the use of such maps, spoil disposal problems may be solved and plans made for transportation and improvement protection provisions.

The spoiling of overburden presents difficulties not always recognized. On extremely sharp hillsides, meaning between 30 and 40 deg, overburden may cascade down the slope into or over various developments, or across a property boundary onto another's land. An examination of one good stripping possibility revealed that in many places the spoil would flow across a property line. With the assistance of a dependable contour map, such obstructions or interferences can be foreseen and provided for.

Transportation, one of the most important items in hillside stripping, is quite difficult to lay out so as to attain maximum efficiency. The amount of road to be built and maintained will, in many cases, equal the length of the outcrop to be stripped. Roads, in some cases, may be shortened by cutting through a low gap to connect the same contour on opposite sides of a hill. In a few places the driving of short, truck-size tunnels seems warranted. Occasionally the use of a belt conveyor may eliminate several miles of truck haulage. Electric locomotive and car haulage has been used to advantage to supplement trucks, which in effect become gathering units. In determining the most efficient and economical method of coal haulage, the contour map will be of inestimable value in the study of individual job requirements.

Adequate Tonnage Reserve Is Essential

My personal observation after viewing possible stripping operations containing reserves of anywhere from 25,000 to 15,000,000 tons is that there is no definite conception as to the proper size of the reserve needed to support a going strip mine. However, the lower limit under average conditions is not far from 2,000,000 tons. The heavy move-in expense, and the amortization of equipment will usually be found to be such that the charge, per ton, on any smaller reserve is too high to provide a sound cost foundation. Exception to and disagreement with this figure is not improbable but probably all the satisfactory operations have had this or a larger reserve from which to work. Such obstacles as those peculiar to the physical characteristics of a coun-

try, involved title rights and financial circumstances may all be contributing factors to the difficulties encountered in assembling a sizable stripping reserve. Many an opportunity to achieve a worth-while operation has been lost through the failure of contiguous companies to recognize the necessity for pooling their stripping reserves. Where outcrops meander back and forth across property lines, recognition of such condition should be given by the various ownerships and every effort made to effect a continuous outcrop by exchange of tonnage, purchase, lease or joint operation. Many opportunities exist for assembling, for individual operation, reserves of from 2,000,000 to 25,000,000 tons. Great difficulties may have to be surmounted but the effort put forth to achieve success will be richly rewarded.

There is a minimum tonnage, under any specified set of conditions, governing the set-up of a well-balanced operation; it is the duty of the strip mining operator to ascertain that minimum tonnage. A short time ago an examination was being made at a small operation into which \$200,000 had been poured; a lease had been taken on a substantial acreage, and a rather high minimum royalty was included in the agreement; an estimate had not been made, so it was not known whether the reserve was adequate to support a set-up; expensive roads were required, that had been partially completed; 16 new trucks had been purchased; drills, compressors, and other miscellaneous equipment was on hand. To provide output to support all of this a $\frac{3}{4}$ -yd shovel was stripping coal. An illustration showing greater lack of balance is hard to imagine, yet there are many jobs attempted on a basis no sounder than this. In the Clarksburg area, lack of balance in the work now going on and that which has been completed is evidenced on every hand. As a result of operating with improper equipment and on a small-reserve-per-job basis, a wonderful large-scale stripping opportunity has been wantonly dissipated, with probably no more than a quarter of its original potential earnings realized. The necessities of World War II alone could justify such waste. Under present day conditions a fair performance may be effected from a reserve of 2,000,000 tons, but any job containing a smaller reserve should be viewed with skepticism.

With a good estimate of the available reserve, the daily and monthly output may be charted. For each 1000 tons of daily output, an investment in plant of about \$500,000 will be required. This figure includes machinery, buildings, and inventory. There are many operations in existence where the plant expenditure is

below this figure, but many will exceed it. Under present-day equipment costs this figure, if not exact, may serve as a reasonably good guide as to the minimum capital required to start a sizable job. Some makeshift arrangement, such as using the same transportation equipment on two different jobs, on different shifts, or on different days when one or the other operation is without railroad cars has been used to lower the capital investment; but if a uniform daily, monthly, and yearly output is the objective, then there is no alternative to making a substantial investment in plant.

The daily, monthly, and yearly outputs are closely related, but each has its individual effect on the calculations determining the profit possibilities of a job containing a fixed recoverable reserve. For instance, the daily output directly affects the number of trucks and the shovel capacity required for coal loading; the monthly output determines the overburden moving capacity; and the yearly output, or the continuity of operation, will affect such items as spare equipment or surplus capacity to cover breakdown or emergency conditions. The major consideration in determining daily, monthly, and yearly output is that such quantities must be balanced properly against the available reserve so that the overhead cost of recovering the entire reserve is held to a minimum.

Every job will have some break-even point when considered on a monthly or yearly basis. If the break-even point of a job can be kept low, its chance for being completed successfully is greatly enhanced. Such reasonably accurate calculations may be made for any stripping job. Jobs falling under 1200 tons per day and 20,000 tons per month output are generally regarded as "questionable," and would require some special advantage to make them worthy of serious consideration. Projects which support an output of 1500 to 2000 tons per day and 30,000-40,000 tons per month usually provide a break-even point low enough to give a reasonable margin of safety. Such jobs, to permit a balanced set-up, require a reserve of 2,000,000 or more tons.

Selection of Equipment

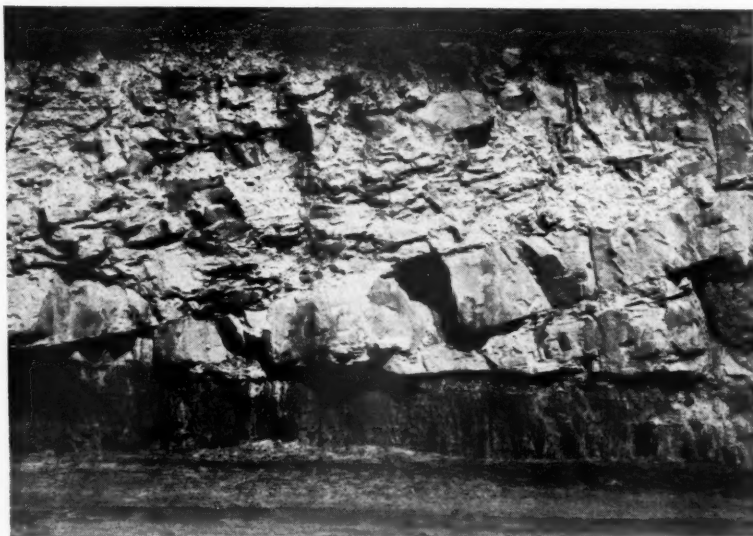
Once a project has withstood all the necessary critical study to determine its economic soundness, detailed consideration will be given equipment needed to meet specific conditions. The equipment requirement will break down into five broad classifications: drilling equipment; excavation equipment; coal loading equipment; transportation equipment; and preparation facilities.

The choice of drilling equipment is a simple problem. Where shale structure is present over the coal seam in

any thickness of 3 ft or more, horizontal drills would, undoubtedly, be chosen. Good horizontal drilling equipment is available. Where sandstone or other hard drilling strata immediately overlies the coal, or where the overburden is of such depth that horizontal drilling will not break the overburden, recourse must be had to vertical drills. On sharp hillside work, vertical drilling presents a problem of careful synchronization with overburden removal so that supply-flow to the drills of water, bits, fuel, and explosives is not interrupted. The heaviest drills, capable of making 9-12 in. holes, will provide the cheapest vertical drilling costs. Good machines are available to do this work. It is definitely more expensive than horizontal drilling but no substitute is as yet available. There seems to be a considerable lack of under-

having 45-ft booms and 30-ft to 38-ft handles will experience difficulty, particularly on inside curves. Use of such equipment on high-wall limits above 40 ft will lower the output of the shovel, and usually bring about high maintenance cost resulting from shoving the overburden with the handle and dipper. Shovels larger than five-yard high lifts call for four-point stripper units. The use of such large equipment is questionable.

Flexibility, which is inherent in the construction of two "cat" machines, is required on mountainside work. The need for this quality may arise from the presence of split seams (where a divider must be handled separately); or from stripping two or more seams with relatively short intervals between. Either of these conditions will necessitate the ready shifting of the stripping machine



Characteristic highwall in the Pittsburgh seam

standing, in the ranks of those new to stripping work, of the definite cost difference between horizontal and vertical drilling in sharp hillside work. For their benefit, it may be emphasized that vertical drilling and shooting of hard strata may cost from two to six times as much as horizontal drilling and shooting of soft strata. Since a large percentage of the outcrop reserves in West Virginia, to be recovered by strip mining, requires vertical drilling, the problem is one that demands recognition in its true perspective, both as to difficulty and cost.

With the selection of proper drilling equipment, consideration should be given to the equipment which will handle the overburden. On sharp hillside work, high-lift shovels of moderate size will handle overburden with relative ease up to a high wall limit of 40 ft; beyond such limit, shovels

from one level to another—a relatively easy task for a two-"cat" machine but quite an impractical one for a four-point unit.

An electric five-yard high lift is the smallest machine which will stand up under three-shift service when handling heavy overburden. This statement may be disputed, but the consensus of opinion will place the shovel size in hard rock near the figure stated. For handling earth and shale, 2½-yd high lifts may be satisfactory; but if sandstone is to be moved in quantity, day in and day out, such size machines will not stand up. The five-yard high lifts are, in many respects, inadequate for much of the work available in West Virginia. There is an outstanding demand for a special shovel for the hillside, outcrop stripping and benching that should be developed by the equipment manufacturers and for which there

would be an almost universal use and application in the vast majority of stripping operations that are developing and will in the future be done in West Virginia. This general utility shovel should be a heavy-duty unit mounted on standard two-belt Caterpillar tracks with full "Ward-Leonard" control electric drive including rotating control. It should be equipped with a front end shovel combination having a dumping radius of approximately 60 ft at a dumping height of between 35 and 40 ft; a cutting height of approximately 55-60 ft; and a dipper capacity of between eight and ten cu yds struck measure. A machine of this type and working range is essential for this work and if available would become a major producing unit in the industry.

If overburden removal is carried beyond 40-ft high wall limits, it may be necessary to use a dragline in combination with a high-lift shovel. A wedge-cut can be taken with the shovel to provide a foundation from which the dragline may work. Under such conditions, a five or six-yard dragline with 100-ft boom is the smallest machine which will prove to be economical. Certain conditions would permit the use of 12 or 14-yd draglines; and some of the finest machines available for moving overburden are to be found in this size classification. Sharp hillside work with a specified high-wall limit of 150 ft above the coal seam bottom could best be done with a combination of 5-yd high-lift shovels and 12-yd draglines. Medium-sized, 18 to 20-yd, stripper shovels because of their range could not be applied to the work since under the limitations created by the high-wall specification they could not dispose of the overburden. This indicates that there are conditions on sharp hillside work where the dragline is an indispensable tool—when indicated, use the largest dragline possible.

Coal-loading equipment should be balanced against the daily output requirements, number of working places and size of transportation equipment. The ideal would be to have one coal shovel produce the daily output. If the uniformity of a seam is beyond question, a chance on a one-shovel, coal-loading operation should be taken. In such a case the same ruggedness of construction should be demanded of the coal shovel as of the overburden shovels. Usually an output of from 1500-2000 tons per day on sharp hill-sides will call for a minimum of two producing faces, thus necessitating two coal-loading shovels. As this is light work, it is generally presumed that there is no necessity for extreme ruggedness in coal shovels. It is good policy, however, to have some margin of safety in the coal-producing machines so that breakdowns during the working shift may be held to a mini-

mum. Dependability is called for at the coal-loading face, and it pays to have a reserve in the capacity of the coal shovels. Adverse conditions at one loading face may be counteracted by the excess capacity of a shovel at another loading face. It is possible to equip standard front-end shovels with light-weight buckets and achieve a considerable increase in capacity; increases of from 25-60 per cent will be found to justify the cost.

Haulage Is a Major Factor

Consideration must now be directed to the transportation problem and its equipment. Sharp hillside stripping presents an annoying transportation problem since satisfactory unit costs can never be obtained. This is due to the adverse ratio of tonnage to miles of road inherent in such work. Licensed units must be used if the coal transportation trucks travel the public highway system for all or a portion of the distance required to get the coal to the point of dumping. This immediately places a limit on the size of the trucks, thus adding to the economic difficulty of doing a stripping job. The use of public highways with their restrictive limitations should, if possible, be eliminated from an operation. This particular problem in some instances may be solved by the building of a private road, extension of a railroad line, or use of a conveyor system for a short distance. If a substantial tonnage is to be transported, a considerable amount of money may be expended in eliminating the use of public highways. Large off-highway units may be incorporated into the transportation plan if the public highway system is not used. Trucks carrying 25 tons on their backs are now available, and similar units carrying up to 40 tons will be available by the end of the year. Semi-trailer units carrying up to 80 tons are now available, and where usable have great advantage over the smaller units. Conditions in sharp hillside work will be encountered where the straight truck has some advantage over the larger semi-trailer unit. In this type of operation maneuverability may be made difficult by the occurrence of tight spots in loading out split seams, or seams lying close together. In such cases the more compact truck will show up to greater advantage than the longer semi-trailer. The transportation unit and the coal-loading shovel should be reasonably well balanced as to size. There is no practical point in loading an 80-ton trailer with a 2-yd shovel. Always use the largest transportation units which the operation will justify.

Good roads are of vital importance in the economical transportation of coal. Important sums of money, \$10,000-\$20,000 per mile, will be ex-

pended on their construction. Such an item of expenditure is sometimes questioned, or delayed, and often deleted. The lack of adequate roads during adverse weather conditions will result in the rapid deterioration of equipment and stoppage of production. All-weather stripping roads require a thick base, two to five feet of heavy rock, topped off with a fine surfacing material which may be worked with a grader at regular intervals. Drainage must, however, be provided to keep water from collecting on the surface and at the base of the road. Corrugated or tile pipe should be used in the drainage of all low points in any road system. In the kind of country we are discussing, good roads will require from three to six carloads of pipe per million tons of coal produced. If it is not installed the money will be spent indirectly, so temporizing with this provision is poor economy.

More attention than during the war years must be given to the preparation of stripping coal. If the strip method of mining is to be successfully continued its output must go to market on a quality basic comparable to the deep-mined product. Some seams are inherently clean enough to be prepared by passing them through the ordinary picking and screening tipple, but most seams available for stripping today must be prepared in a good washing plant to meet market requirements. Too much emphasis cannot be placed on the consideration given a strip-mining coal reserve to predetermine the treatment it must receive to assure its marketability. Many going operations which have ignored this consideration will eventually stop because the product will be below market specifications.

Conclusions

Financing a sizable stripping project is usually a problem which must be solved. If all the preceding problems have been determined there should be little difficulty in preparing a profit and loss statement on the project showing the degree of financing necessary and the margin of safety present to support such financing. If this statement is carefully prepared, bankers will consider the proposition and, if sound, finance it in a practical manner. Many companies and individuals connected with the coal-mining industry of West Virginia have within their grasp one of the greatest opportunities ever available to them. Whether full benefit of this opportunity is realized depends upon the degree to which advantage is taken of all the best facilities available to initiate, operate, and carry through to completion sizable stripping operations in this rugged country.



Going on shift to the bottom of the 16-ft diam air shaft

Unusual Air Shaft Construction

Churn Drill Pilot Shaft Speeds Shaft-sinking Job

IN order to provide an ample supply of fresh air at the Statesbury No. 8 mine of Eastern Gas and Fuel Associates an air shaft was recently sunk to reach the mine workings about 1½ miles from the main portal. The pilot-hole method of sinking was used. Engineers of the company's shaft division modified customary practice by constructing a bin at the bottom of the hole to collect the broken shaft material. This eliminated loading the broken material from the floor of the mine into cars.

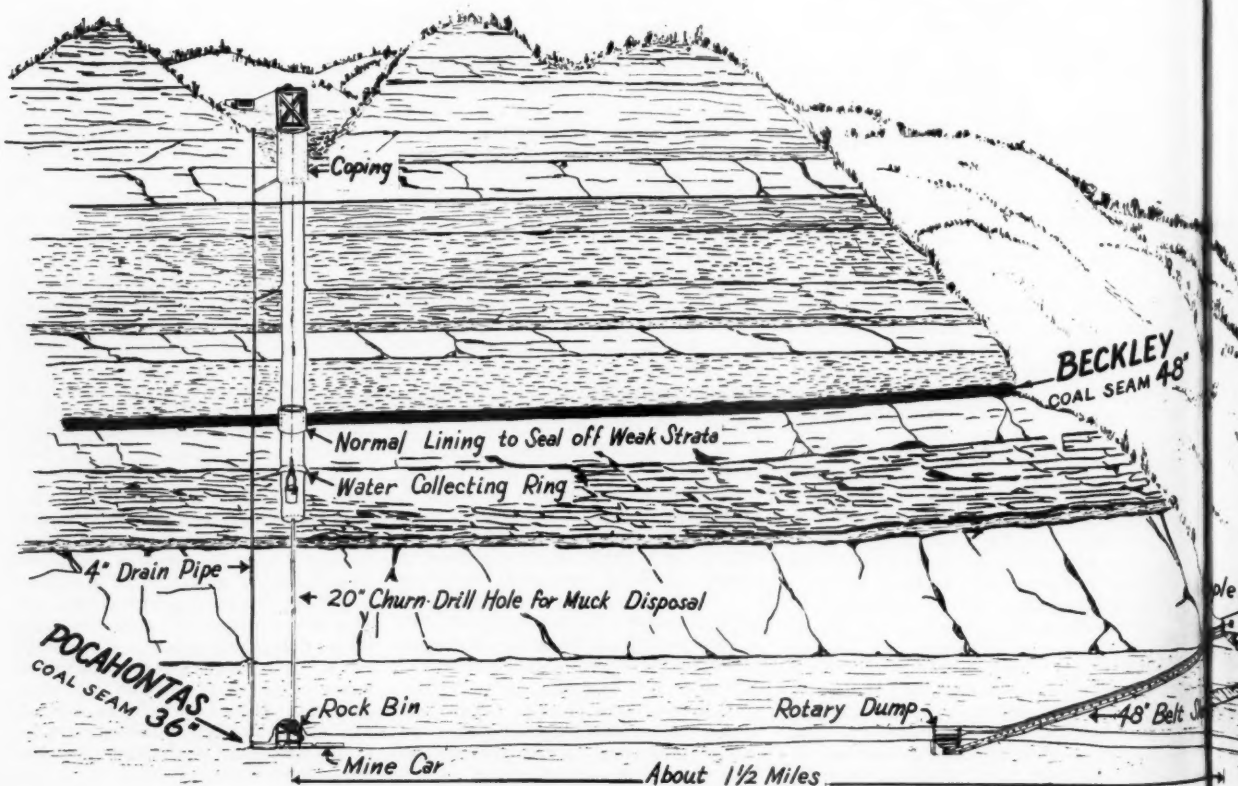
A 20-in. churn-drill hole was made in the center of the shaft site before actual mining operations were begun. The churn-drill hole was connected with workings 538 ft below the collar

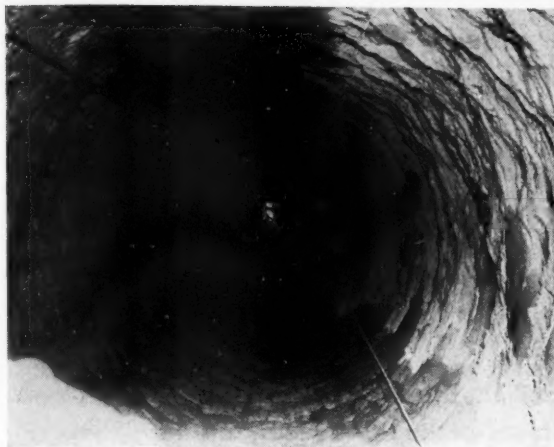
and all the material broken in driving the 14 ft diam shaft was dumped into the churn-drill hole to collect in the bin located on the level of the haulageway.

In an actual working time of three months, three weeks, and one day the air shaft was completed. Up to 6000-odd yards of excavated material was dropped in the churn-drill hole. All the broken material was hauled away from the bin in mine cars over the regular haulageways.

Reinforced concrete, 2 ft thick, lines the first 59 ft of the shaft and will eventually serve as a base for a fan. The remaining excavation through solid rock is unlined except for the portion of the shaft that passes

Below: Cutaway drawing of mountain showing the location of the air shaft





Looking straight down the shaft. The crew is dimly visible at the bottom

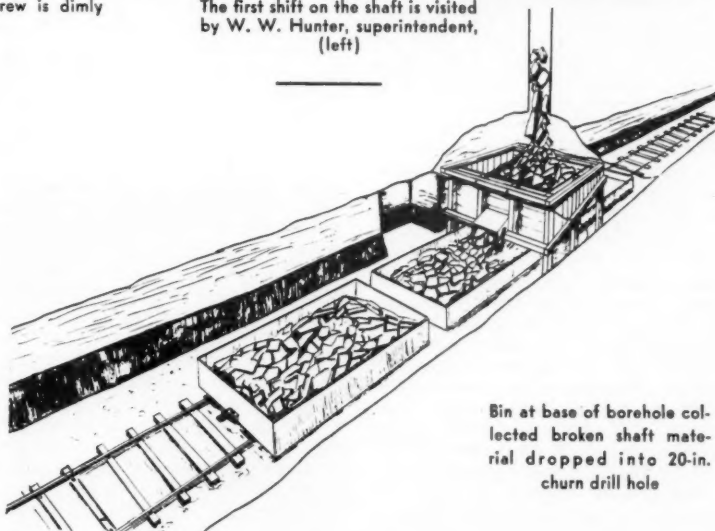


The first shift on the shaft is visited by W. W. Hunter, superintendent, (left)

through the workedout Beckley coal seam. For diverting water which might run into the shaft, a bore hole has been drilled 5 ft away from the walls of the shaft. Water-collecting rings remove the water from the shaft walls. The water passes to the 4-in. drain pipe in the bore hole adjacent to the shaft and drains out on the haulage-way level.

Plans call for utilizing the new shaft as an air intake for the next two years. After that a fan will be installed to cut down by one-half the distance of air travel.

Completion of this unusual shaft-sinking job in less than four months is an accomplishment that warrants a commendation for the coal-division engineers and shaft-department crews of Eastern Gas and Fuel Associates.



Bin at base of borehole collected broken shaft material dropped into 20-in. churn drill hole



C. O. Carman, mine foreman, loads a car of waste

Mining and Leaching

Secondary Copper Ores

A BELT, three to five miles wide, of old crystalline schists, is traceable from Copper Hill, Tenn., in a general direction of N 50 E, to Carroll County, Va. Throughout this belt many lenses of pyrrhotite are recognizable at the surface by gossan outcrops. These lenses are arranged in echelon and range in length from a few hundred feet to 2500 ft, and vary in width from 30 to 150 ft. An unusually large exception to these isolated lenses is the huge structure in Carroll County, Va., where a length of over 17 miles has been proven and explored. This structure takes the form of a Y, with two opposing lenses dipping towards each other to what may be a vertical leg midway between the two. This structure is probably the largest known body of pyrrhotite in the entire country.

At Copper Hill and Ducktown, Tenn., where five or more lenses are mined for primary ore, and at several points along the ore lead in Carroll County, Va., there was once great activity in prospecting and mining secondary copper ores. Ores from Copper Hill and Ducktown were hauled by wagon to Cleveland, Tenn., for smelting to furnish copper to the Confederate government.

Along the lead in Carroll County, where there was feverish activity, between 1855-61, this ore was selectively mined by shafts, slopes, and tunnels along the strike, boxed or barreled, and hauled 135 miles by animal-drawn wagon to Lynchburg, Va. Then it was shipped by rail to the Old Globe Smelting Works, at Baltimore. These pioneer operators must have had unique methods of selecting the higher grade ore as the available records indicate there were no shipments of less than 12 per cent copper and many of 20 per cent. Just before the outbreak of the Civil War, the more enterprising operators undertook a matte smelting project near the center of activities to eliminate the long haul on crude ore. The plant was never completed due to the war conditions, but the foundations and general layout are still to be seen.

Uniformly in evidence in the lens being worked at Toncræ, and in all those prospected, the oxidized zone extends from the outcrop to an average depth of from 45 to 60 ft. Below this are the concentrates of copper, known as secondary coppers, smut

ores, and natural concentrates. Mineralogically they are calcocite, bornite, and covellite, with calcocite predominating. These secondary coppers lie approximately horizontal and make a well-defined contact with the gossan roof. The bottom, or contact with the primary ore, is extremely irregular because of water-worn troughs or gullies that extend from the foot wall to the hanging wall. Invariably, high grade ore which often assays 20 to 25 per cent copper is found in these troughs.

By C. H. THOMPSON

President
Toncræ Mining Co., Inc.

Mining Methods

The Toncræ orebody is 800 ft long and 130 ft wide from wall to wall of the lens. Three distinct divisions are known as the "west ore," "middle ore," and "east ore." Including schist partings of 10 to 23 ft, these divisions comprise the 130 ft width of the lens. In mining this secondary ore, it has been necessary to use the gossan as the top of drifts, crosscuts, and other workings and to limit the height of these to provide a regular bottom for haulage purposes. Thus, the ore is blocked out in advance mining and robbed on retreat mining, at which time the high grade ore in the troughs is won.

On the east side of the ore body a 4 per cent slope, 250 ft long, has been driven towards the hanging wall. It follows along the hanging wall to the end of the ore body. Crosscuts on 60-ft centers go to the foot wall and have narrow drives between them for ventilation. All are securely timbered. The cars are lowered into the mine from a single-drum hoist by gravity and distributed to the mouths of the various crosscuts, where they are loaded by wheelbarrows from the nearby working places.

Two-ton mine cars are used with a 36-in. gauge track. Ore is delivered to a 50-ton ore bin situated 100 ft from the mine mouth and above and near the edge of the roasting yard. The ore is discharged from the bin through a chute, taken by a horse-drawn scraper to the roasting yard, and there leveled in a layer approximately 5 ft thick for heap roasting. With careful timbering on advance work, 85 per cent of the ore can be



Detinned scrap serves as precipitant

safely extracted. The copper content of the remaining 15 per cent of the ore is nearly completely recoverable by allowing the ore to alter in place. Outside water is pumped into the mine for leaching, and the pregnant solution is pumped out from a low point in the mine.

No average vertical thickness of the secondary zone nor average copper content is ascertainable until a given ore body is exhausted. However, operations are conducted on the assumption of 10 ft of vertical thickness as an average height and 7½ per cent of copper as the average content.

Observation Reveals Recovery Method

At the outset of extensive field work and research on these ores, and during the actual prospecting, it was not known just what mode of treatment would be available for this little-known type of ore. Gravity methods of beneficiation were tried without much success. Oil flotation failed, too, as did matte smelting. Finally it was discovered that stockpiles accumulated from prospecting were giving off heat and destroying any nearby vegetation. On occasions miners complained of heat and fumes at certain points where air circulation was sluggish. A thermometer left in these places overnight recorded temperatures as high as 146 F. These conditions indicated the unstable nature of these redeposited ores.

After six months of exposure, ore piles carrying close to 8 per cent copper were sampled. The larger part of the copper had been altered, leached, and lost. A 1000-lb sample of representative ore was crushed to a minus 1-in. mesh and a 9-in. layer was placed in a concrete container. After 30 days of alteration in the open air, the sample was leached, resampled, and put back for further action. On completion of the test, it was found that the ore sulphatized at the rate of 1 per cent of its contained copper per day. Similar tests made at 60 and 90 days showed a slower rate of sulphatization, but at the end of 120 days the copper left as sulphide was negligible. At this point it was decided to heap roast and leach.

By heap roasting is meant the oxidation or altering of the pyrite and the various copper sulphides contained in the run-of-mine-ore without adding fuel to supplement the heat produced by the oxidation of these sulphides.

The peculiar behavior of these secondary ores is based on the long-overlooked fact that both the contained pyrite and the copper sulphide are of secondary origin, and hence unstable both chemically and physically. Their avidity for oxygen accounts for the rapidity with which they sulphatize and become water soluble when piled

in layers of arbitrary thickness on a prepared yard. No fixed rule is followed for leaching. From the behavior lowed for the thickness of the ore of the ore mined in prospecting and piled near the shafts it was deduced that a six-foot layer is quite satisfactory when the ore is crushed to



Pregnant solution enters launder

pass a one-inch grizzly. Sampling after four or five months of exposure showed that there was practically no copper remaining as sulphide in the stacks. This indicated that the copper in the ore had been nearly completely sulphatized and leached out by rainfall. It was then concluded that a stacking plan should be followed for treating the ore. The mine water with which the leaching is done helps the process as it carries oxygen to the bottom of the pile to supplement the air contained within it.

As the topography of the ground

was not ideal for construction of the roasting yard, a rather steep ravine close to the ore bin was used. The top soil was removed, the surface rolled and treated to prevent seepage, and a 30,000-gal sump was prepared at the end of the ravine.

Leaching

All leaching is done with mine water, which carries from 0.1 to 0.3 oz of copper per gallon. On occasions of pump failure, when the water rises in the mine, the contained copper in the water rises rapidly until the water returns to its normal level. Bronze pumps capable of delivering 70 gpm are used. The water is discharged through 2½-in. fire hose connected to the pumps by copper nipples. Pumped through a sprinkler head, the mine water is applied uniformly over the ore pile until there is evidence of a lowered temperature in the pile, or of a weakened solution coming from the ore. At this point the mine water is discharged into the sump. There is no great art in leaching, as it is found that the water carries enough oxygen to assist materially in the sulphatizing process throughout the orepile. However, the amount of water must be regulated to avoid diluting the solution and slowing up the precipitating action in the launder.

The solution is carried to the launder in a 3 in. compressed wood-pulp pipe line, after passing through an ore box. The ore box is filled always with sulphide ores of iron and copper, preferably primary ore, through which the solution passes to convert any ferric sulphate into ferrous sulphate, and to kill any free sulfuric acid in the solution. The ore in the ore box is changed at suitable intervals based on the analyses of solution for ferric sulphate.

The launder, built on a grade of 4 in. per 100 ft, of 2-in. T&G dressed lumber, using copper nails only, and with all joints carefully tarred, is 155 ft long, 42 in. wide, and 32 in. high. Sloping drain boards are set along

(Continued on page 54)



Ore box at launder intake



Storage methods add to the fine coal problem

What Will the Industry Do About Fine Coal?

A FLIPPANT answer to the question posed in this paper's topic would be that the coal industry is going to continue producing fine coal, and will continue to merchandise it by one method or another. Nevertheless, there are sufficient serious aspects to the problem which require more than off-hand consideration and answers at this time.

For the purpose of this paper's coverage, fine coal will be considered in its broader definition. It does not matter too much whether it is called slack, bug dust, minus $\frac{3}{4}$ in., minus $\frac{1}{2}$ in. or minus 28 mesh coal. Certainly all producers, whether anthracite or bituminous, have their fine coal problems regardless of their definition of its top size. The whole problem has not changed too much from NRA days when it was volunteered that the only trouble with the coal industry was too much slack coal and a bureaucrat immediately stated that the problem ought to be solved easily by shutting down the slack mines.

As to whether the mines are going to continue producing fine coal; the answer seems to be yes, and in increasing quantities. Looking back over 20 years of changes in face methods, it is quite evident that most of them have increased fine coal percentages. It is true that the pick miner's fine coal has practically been

eliminated. Cardox and Airdox installations have been made for less slack, power drilling has improved shooting, better detonators and slower explosives have helped, and bug dusters have decreased blasting requirements. Nevertheless:

- (1) Fine coal percentages have increased in direct proportion to face mechanization at any given mine. Deeper undercuts, shearing, increased concentrated blasting charges, permissible explosives, and mechanical loading and conveying have all taken their toll in decreased lump sizes and thereby increased fines.
- (2) Increased fine coal is made by demands for lower ash in large coal, particularly where sizes must be crushed to wash out entangled impurities.
- (3) Increased fine coal is being made by seasonal or systematic crushing of large coal to produce special sizes such as stoker coal.
- (4) Increased fines are resulting from customers specifying maximum top lump sizes requiring destruction of the large lump by picks or crushing.



By J. W. WOOMER

Mining Engineer

- (5) Increased fines result from "cracking" large lumps so as to narrow the size range of washer feeds and keep their efficiency. This is motivated by the high labor cost of any hand picking.

The industry, therefore, is faced with, first of all, the ever-present normal percentage of fines, plus the never-ending increase resulting from every move that is made to decrease cost and retain markets. Can it afford to stop its application of machinery and the correlated improvements that go with labor elimination for the sake of decreasing these fine coal percentages? Can it afford to waste even the smallest percentage of its fines? The answer is that it cannot.

With the average value of \$4.00 per ton for bituminous coal for 1947, an increase of 56¢ per ton over 1946, and with an average value of \$7.54 per ton for anthracite for 1947, an increase of 71¢ per ton over 1946, mostly caused by advancing payments to labor, there can be no stoppage of improvements in mining cost. Even those who are reconciled to the philosophy that the consumer will always pay cannot ignore the facts that—

Crude oil production increased 7 per cent in 1947 over 1946
 Natural gas sales increased 14 per cent in 1947 over 1946
 Manufactured gas sales increased 11 per cent in 1947 over 1946
 Oil burner unit sales increased 162 per cent in 1947 over 1946
 Locomotive liquid fuel consumption increased 3 per cent in 1947 over 1946
 Utility company fuel oil consumption increased 40 per cent in 1947 over 1946
 Utility company gas consumption increased 10 per cent in 1947 over 1946,

whereas anthracite and bituminous coal production increased only 14 per cent.

Up to this point the paper has confined itself to a portrayal of the amount of fines to be handled, and particularly to the trend toward increased quantities of them caused by the competition for markets in a high labor cost industry and with the high-

est labor hourly rate in the country. Having convinced ourselves that we must conserve and sell all fines, we can turn to an equally serious problem, their quality.

The acuteness of the problem of quality of fine coal has been postponed by several things, as follows:

- (1) Eight years of a war period with demand at a high level
- (2) Advances in combustion facilities by large consumers who were able to absorb large quantities of low quality fines
- (3) A movement of large utility base plants to the coal fields
- (4) Enormous metallurgical consumption of all coals that were suitable for this purpose
- (5) The increased number of domestic stoker installations with the consumer content for the moment with high ash stoker coal
- (6) The publicity given current research work.

Day by day, however, with increased mechanization, the fines have deteriorated in quality. Up to 1947, the country was tooled to produce nearly 60 per cent of its coal with face machinery, yet only about 26 per cent of the total production was mechanically cleaned with the percentage of fine coal cleaning something less. Furthermore, due to war delivery conditions and particularly to market demand, the year 1947

brought no marked acceleration in cleaning installations.

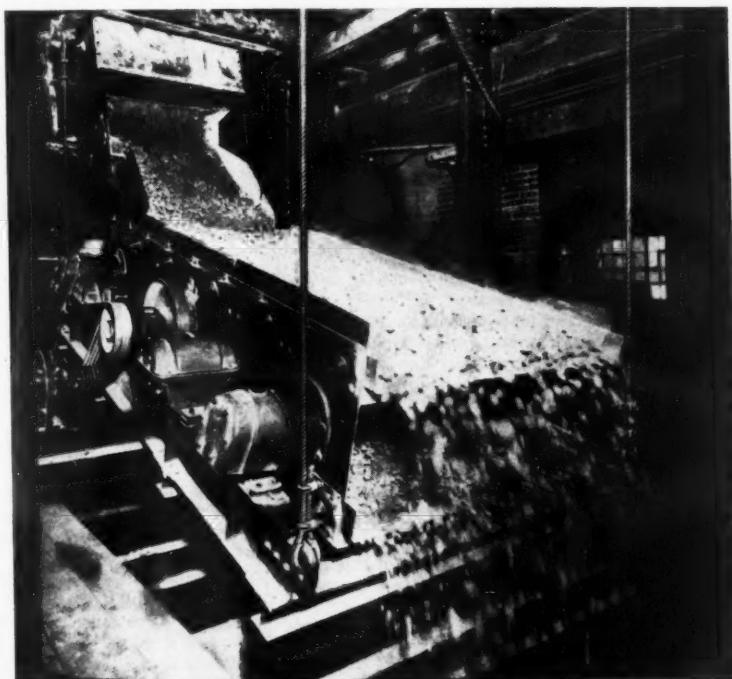
As of this time, therefore, we find the industry as a whole much worse off than it was in 1937 insofar as any particular district's ability to stand a drop off in demand is concerned. The highly mechanized bituminous production areas are still at the mercy of superior fine coal from other or metallurgical rank districts which can be sold to their customers in a buyer's market on a delivery Btu basis. There are exceptions to this general fact but, in the main, only where the poor quality of fines or the advanced degree of mechanization has demanded superior fine-coal processing has fine-coal processing moved forward.

The exception to the above is the anthracite status. Here fine coals have been processed and merchandised extensively for many years. In fact, their fine coal problems have been nearly reduced to a culm size only. This problem is chiefly created by stream pollution legislation. Even in the solution of this problem, it is being found that the recovery can be economical.

The anthracite status in fine-coal cleaning flows from their acceptance of *full-seam mining* as a necessity. The bituminous future lies in this direction. A study of the Carboniferous Age coals will show conclusively that the bulk of this coal when mined mechanically will be mined by so-called "full-seam" methods. Extraneous material to be handled with the clean coal will be as high as 50 per cent by weight and probably average 25 to 30 per cent. Certainly this mining will require mechanical cleaning of the fine coal.

Summarized, these answers to this paper's title question may be made as follows:

- (1) If the industry moves ahead with face mechanization, there will be an increasing percentage of fine coal
- (2) Mechanization of the cleaner seams is lowering the quality of the fine coal
- (3) Pressure for better recovery in the clean coal seams will increase the quantity and further decrease the quality of the fine coals
- (4) It appears that the remaining Pittsburgh seam, particularly where draw-slate is present, will be mined 100 per cent full seam within a few years. This will permit no marketing of raw fine coals
- (5) Within 25 years, a great percentage of the Carboniferous Age bituminous coals will require full seam mining to be mechanized. This will all require fine coal processing.



Quality control assures high Btu product

Coal Team Responsibilities

From this forecast, a tabulation of the responsibility of the various members of the coal team can be made.

The Manufacturers of Coal Processing Equipment should

- (1) Carry on high level research to improve cleaning and drying techniques.
- (2) While presenting designs for the transition stage, always bear in mind the need for higher capacity cleaning and drying later.
- (3) Study installation, power, and operating costs thoroughly at existing installations so as to be able to present accurate estimates to the producers. The estimates are extremely important for high level financing over the life of the properties.
- (4) Study each plant's problem even to the face and into reserves. In many cases, a correct application of a plant will yield great savings at the face.
- (5) Round out their products so that progressive installations can be made to keep pace with marketing demands for each installation.
- (6) Study coal marketing so as to be able to forecast trends. Some coal's market areas can be changed to meet economi-

cal plant installation's requirements.

- (7) Realize that in the future plants will be installed more for earnings than for marketing whims.

Management, right down to mechanical crew supervision, should

- (1) Strive to decrease fine coal in face installations and methods.
- (2) Recognize the long pull trend, dictated by the geology of the country's reserves, toward full-seam mining. Vision as to the date of any one property's or company's need for this adoption is expected by capital from all management.
- (3) Act on a basis that mine wages will continue to be high and that investment dollars may be cheaper than labor dollars.
- (4) Study the research developments of their markets with the fine-coal research findings. The decision and responsibility as to whether a fine-coal plant shall be wet or dry or a combination of both is management's as well as the preparation engineer's.
- (5) Realize that a peculiar outlet for raw, fine coal that exists today can disappear on a delivered Btu basis.
- (6) Realize that uniformity as to sizing and quality is as im-

portant as extra good quality in most cases. Mechanical preparation will give this.

Capital should

- (1) Realize that all investment in modern mines may be jeopardized without a fine-coal program.
- (2) Appreciate that coal mining is an expensive business and that substantial replacement capital will be required over the life of any property. Fine-coal plants are expensive.

Labor should

- (1) Realize that their future lies in the success of the industry in all its ramifications.
- (2) Know that, while mechanization has yielded their present high income, the job is not done. Business is faced with large capital expenses, which the coal must carry, to carry this fine-coal problem forward as well as the other problems.

The consumers must realize that

- (1) Coal is the most dependable fuel and that the industry means to keep it so.
- (2) As taxpayers and citizens, the industry has the talent to keep pace with the best technical advances, if it is not subjected to emotional handicaps.

Mine Labor Supply

(Continued from page 24)

gone, and the present-day working man insists on some measure of personal dignity and self respect. If he does not receive it, he simply walks off the job and another miner is lost to the industry.

Underground working conditions must be improved in every possible way. Safety measures must be improved and insisted on. Men must be trained in safety, and the importance of safety explained to them in such a way that they themselves will become the best of safety inspectors. Among other things, health hazards peculiar to the industry must be better controlled and should be a part of the safety program.

In the deeper mines, heat and humidity are two more conditions that must be improved. Modern methods of cooling and dehumidifying the ventilating air will soon become a necessity.

Mechanization should be increased and improved to the highest possible degree in order to eliminate, insofar as possible, the hard physical labor

and the drudgery that is necessarily connected with mining processes.

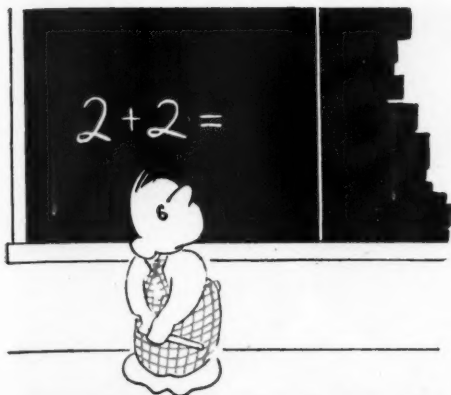
Substantial progress along the lines suggested will help to keep miners during the few times that jobs are scarce, but let's not delude ourselves that underground work is as attractive, as pleasant or desirable, as work on the surface or in the modern industrial plants and factories. With all industry paying the highest wage rates in history, and surrounded as we are by enormous power, flood control, and irrigation projects that will require years to complete and that are financed by Government funds which are apparently inexhaustible, we find men leaving the mines by the hundreds, to join the thousands already employed in this construction work. As the early-day prospector came West in the hope of making a fortune, and the immigrants came to the mines in order to better their financial condition, so the present-day working man goes where he can get the most for the only thing he has to sell—his labor! Under these conditions the situation confronting the mining industry today is not a pretty picture. Although metal prices are at the highest point in history, production is at an extremely low point, with mine crews

at 50 per cent or less of normal. Many of these men are green and inexperienced and do not remain long enough to learn to be of any value to the employer. They stay just long enough to decide that they do not like mining, and then leave to take another job on the outside.

So, barring a severe depression or increased immigration, the future for mine labor looks dark indeed, unless the mining industry can afford to put into effect a substantial differential in pay between underground labor and comparable labor on the outside.

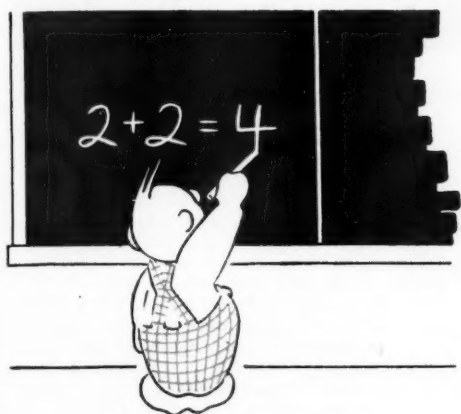
Some of the necessary steps to be taken are:

- (1) A publicity campaign to acquaint the public with a true picture of underground working conditions as opposed to the distorted ideas that it now has
- (2) Continued effort to improve all working and living conditions, including ventilation, safety, mechanized methods, tools, and housing
- (3) More and better supervisory personnel and training
- (4) Relax immigration quotas until the emergency is over
- (5) A substantial differential in pay between underground and outside labor.



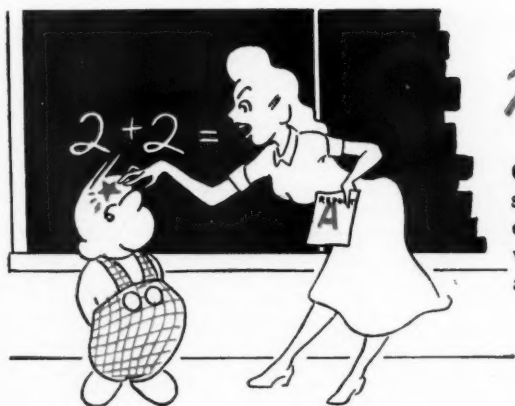
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J. J. HUETHER
Manager, Transportation Division
General Electric Co.
Chairman, Manufacturers Div., AMC

San Francisco Meeting Plans Outlined

Committee maps Program for a record Convention and Exposition of the metal and non-metallic mining industry, September 20-25.

MINING men will have a top-notch meeting when they get together in San Francisco, September 20-25, for the 1948 Convention and Exposition sponsored by the Western Division of the American Mining Congress. To insure a program that will attract the interest and attention of the entire mining industry, leaders in the field have put forth a lot of effort.

State chairmen from the principal mining states, members of the California Committee, and staff members of the American Mining Congress met in San Francisco on June 9 with E. S. McGlone, National Program Committee Chairman, and Worthen Bradley, Chairman of the Western Division, in an all-day session, to shape a program. A great number of suggestions submitted by Program Committee members and mining men throughout the industry were weighed in the light of their importance and interest to mining men, and a program was outlined for the Convention which will bring out the most important problems that call for industry consideration and action at this time.

Six general sessions of the Conven-

tion will be devoted to addresses and open discussion on such subjects as labor relations, manpower, taxes, outlook for the metals including gold and silver, effect of the rearmament program and foreign aid on the mining industry, exploration and development, tariffs, stockpiling, marginal mines, public lands, traffic problems, etc.

Four operating sessions for the men responsible for day-to-day performance at the mines will include papers on high-speed rock tunnel driving with modern equipment, tungsten carbide bit developments, the newest methods and equipment in shaft sinking, conveyor haulage, factors affecting adoption of open-pit mining, stripping with large-size, heavy-duty equipment, dredging problems, advances in milling practice, fine grinding, safety and hygiene, and other topics of great importance to operators.

Celebrating the Golden Anniversary of the American Mining Congress and the Centennial of the discovery of gold in California, the 1948 Metal Mining Convention in San Francisco will run through the entire week be-

ginning September 20. All Convention sessions and exhibits of mining equipment will be held in the Civic Auditorium, Monday through Thursday, September 20-23. The entire space of the main arena and adjoining corridors will be filled with exhibits. The general sessions and operating sessions will be held in adjoining Polk and Larkin Halls.

Trips to the California gold-mining country will be featured on Friday and Saturday, September 24 and 25. They are being arranged by the Trips Committee, headed by H. A. Sawin. Visits will be made to dredging operations in the Sacramento Valley and to the historic mother lode country. A trip will be made to one of the high-ball, tunnel-driving jobs that is fully mechanized to make record daily advance.

Ample accommodations have been pledged by the leading hotels of San Francisco. A list of these hotels and their rates has been mailed out and it is suggested that immediate reservations be made as a heavy attendance is expected. All reservations should be made directly with the hotel of one's choice.

Arrangements for the Convention are being made by the San Francisco Committees, under Worthen Bradley, General Chairman; Al Knorp, Vice-Chairman; G. S. Borden, Entertainment Chairman; Mrs. Carlton D. Hulin, Ladies' Chairman; J. B. Newsum, Reception Chairman; Jack How, Attendance and Publicity Chairman; and Gordon I. Gould, Finance Chairman.

A welcoming luncheon, with appropriate speakers, will be held at the Civic Auditorium on Monday noon. On Monday night a dinner dance will

be held at the Mark Hopkins Hotel. A troupe of professional entertainers will round out the evening's fun. Wednesday night will feature a boat trip on historic San Francisco Bay. Special salt-water entertainment has been set for the sea-going conventioners. On Thursday night, to top off the Convention, will be the Golden Anniversary Banquet at the Palace Hotel. Everyone will want to hear the banquet speaker's address on a topic of nation-wide importance. A succession of talented entertainers will cap the evening's activities.

Ladies are welcome to all Convention functions, and at the special daytime entertainment features being planned for them by the Ladies' Committee.

Under the leadership of Chairman J. J. Huether of the Mining Congress' Manufacturers Division, an outstanding exhibit of mining equipment is planned which will be the largest and most complete ever shown. A total of 86 leading manufacturers have been assigned approximately 25,000 sq ft of exhibit space. Many new developments and improved types of equipment will be displayed. The exhibits afford an unusual opportunity for all mining men interested in mechanization and increased efficiency to examine and compare the latest types of machinery, equipment, and supplies, and to discuss their problems with the manufacturers' engineering representatives.

Current high wage costs and a still-with-us shortage of manpower add to the importance of the exhibits and their practical value for operating men. Mine superintendents, foremen, engineers, mechanical and electrical

State Chairmen	
<i>Alaska</i> JAMES K. CROWDY, New York Alaska Gold Dredging, Co.	<i>Oregon</i> FAY I. BRISTOL Bristol Silica Co.
<i>Arizona</i> P. D. I. HONEYMAN Inspiration Consolidated Copper Co.	<i>South Dakota</i> GUY N. BJORGE Homestake Mining Co.
<i>California</i> P. R. BRADLEY, JR. Pacific Mining Co.	<i>Texas</i> E. McL. TITTMANN Southwestern Dept. American Smelting & Refining Co.
<i>Colorado</i> C. J. ABRAMS Climax Molybdenum Co.	<i>Utah</i> W. H. H. CRANMER New Park Mining Co.
<i>Idaho</i> HENRY L. DAY Day Mines, Inc.	<i>Washington</i> D. I. HAYES American Zinc, Lead & Smelting Co.
<i>Montana</i> GAILEN T. VANDEL Jardine Mining Co.	<i>Mississippi Valley Area</i> O. W. BILHARZ Bilharz Mining Co.
<i>Nevada</i> W. S. LARSH Nevada Mines Div. Kennecott Copper Corp.	<i>Lake Superior District</i> CHAS. J. STAKEL Cleveland-Cliffs Iron Co.
<i>New Mexico</i> G. T. HARLEY Potash Operations International Minerals & Chemical Corp.	<i>Eastern States</i> R. L. McCANN New Jersey Zinc Co.
	<i>Manufacturers</i> J. J. HUETHER General Electric Co.

maintenance men, mill men, and all those on mine staffs who are responsible for mine operations and production will benefit both from the exposition and from the operating program at San Francisco, as well as from the opportunity to exchange ideas and experiences with other up-and-coming mining men from other areas. Many

mining executives are planning to have a considerable number of their operating men in attendance at the San Francisco Convention, to take advantage of the many papers and exhibits that lead the way to greater output at reduced costs. No one can afford to miss this dividend-paying event.



Program Committee, meeting in San Francisco, take time out for lunch. Around table from left to right: S. H. Williston, Cordero Mining Co.; Gordon I. Gould, H. W. Gould & Co.; C. E. McWhorter, Goodman Mfg. Co.; Sheldon P. Wimpfen, Mining Congress Journal; C. J. Abrams, Climax Molybdenum Co.; H. N. How, Western Machinery Co.; Robert M. Searls, Counsel, California Chapter, AMC; P. D. I. Honeyman, Inspiration Cons. Copper Co.; Walter S. Larsh, Kennecott Copper Corp.; Mrs. H. Robinson Plate, Ladies' Vice Chairman; Julian D. Conover, American Mining Congress; Mrs. Carlton D. Hulin, Ladies' Chairman; Worthen Bradley, Bradley Mining Co.; E. S. McGlone, Anaconda Copper Mng. Co.; Roy A. Hardy, Getchell Mine, Inc.; Neil O'Donnell, Idaho Maryland Mines Co.; L. T. Kett, Mountain Copper Co.; P. R. Bradley, Jr., Pacific Mining Co.; D. H. McLaughlin, Homestake Mng. Co.; John Parks Davis, Mining Attorney, San Francisco; Wm. Wallace Mein, Jr., Calaveras Cement Co.; Albert F. Knorp, California Chapter, AMC; W. H. H. Cranmer, New Park Mining Co.; E. McL. Tittmann, American Smelting & Refining Co.; Ira B. Joralemon, Cons. Engineer, San Francisco; J. B. Newson, Cons. Engineer, San Francisco; P. D. McMurrer, American Mining Congress

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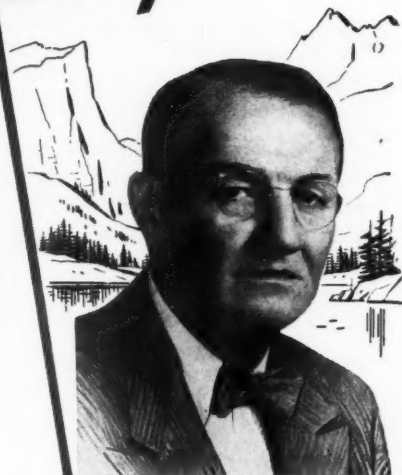
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Projective Geology and the Search for New Ore Deposits

WITH the possibility of an acute metal shortage arising in the future similar to the one that existed during the war period the ability of the domestic mining industry to meet future metal requirements becomes of ever-increasing importance. These requirements can be met for at least one more such emergency through the employment of measures similar to those used by the government in World War II. If, however, we are to maintain production in a healthy condition, the greater the impending emergency, the greater will be the need for accelerated, well-directed exploration and development. Such a program would not only take care of the future but would make up for the work that could not be done during the war period due to labor shortages and government restrictions. The provision for long-range exploration on the part of the larger mines by subsidy may be necessary to stimulate exploration beyond the normal balance between production and extraction.

In the case of the smaller mines and particularly those closed with the expiration of the Premium Price Plan the reestablishment of a subsidy may

Here a competent mining geologist urges extension of the scale of geologic thought. With his wife as a partner, Mr. Beeson has proved the value of his theory by bringing several mines into production.

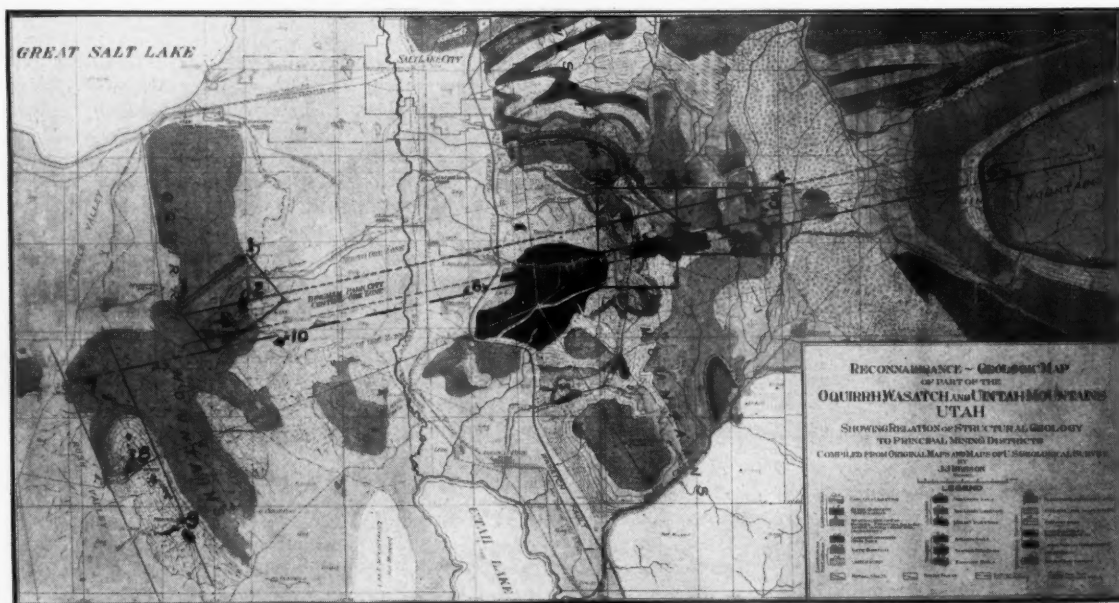
By J. J. BEESON

Consulting Mining Geologist
Salt Lake City

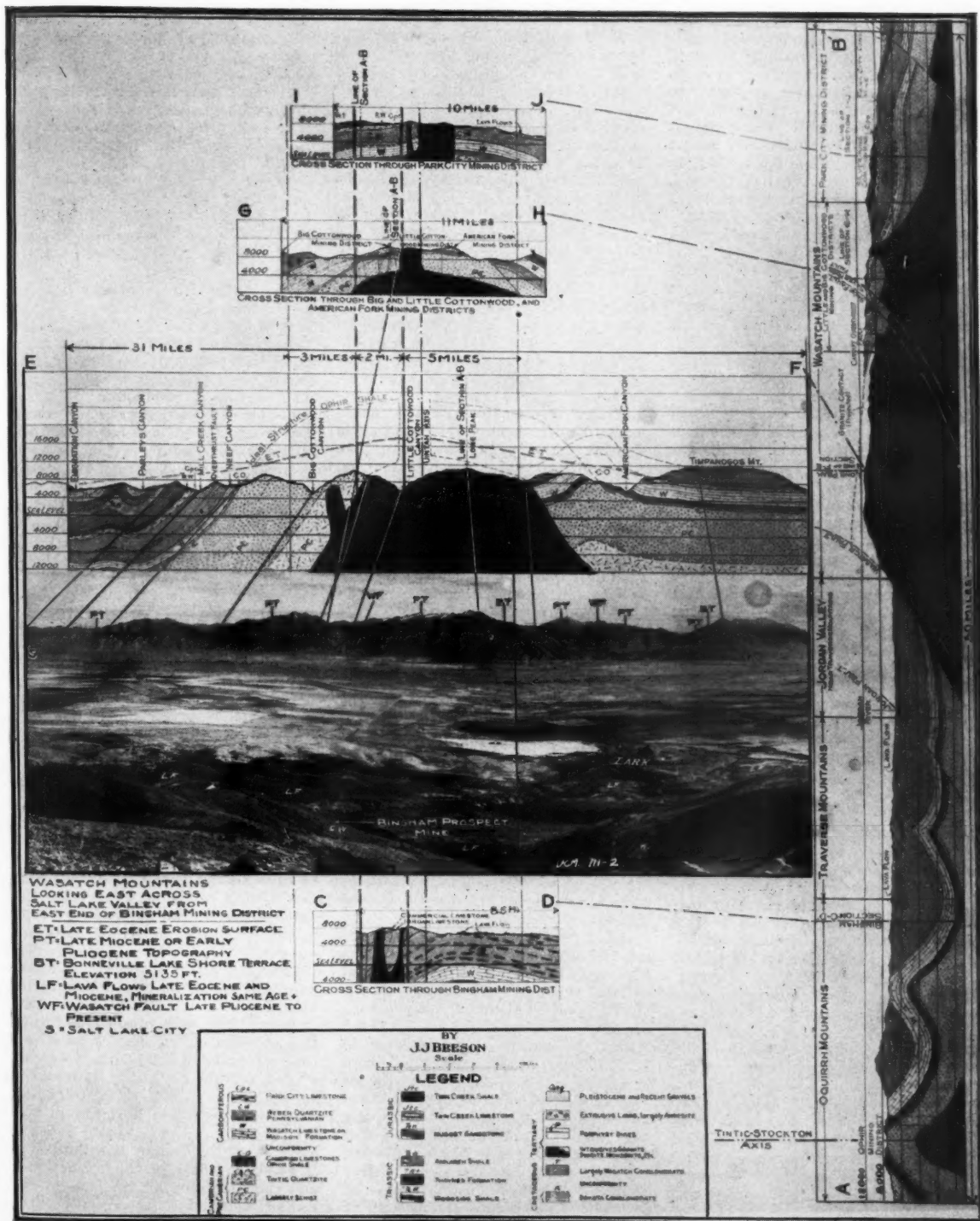
be necessary, and government stock piling will add to the available supply of metals on short notice. If these and other constructive steps, particularly in the field of tax reform, are taken we should be able to extend our independence in nonferrous metals far into the future.

In indicating that exploration must be well directed it goes without saying that larger operators, with adequate engineering staffs, must be given plenty of latitude for both short and long-range programs. With the intermediate sized and small mines,

the services of the independent geologist or mining engineer should be used as much as possible in laying out work likely to succeed. In particular, this applies to long-range projects. If the vigorous life of the mining industry is to be maintained, the use of projective geology must be expanded far beyond the usual conception. Hence, the U. S. Geological Survey and Bureau of Mines must be given increased appropriations to accelerate their work in forming a basis for extensive exploration by private capital.



A combination of detailed and large-scaled thinking enabled structural correlation of two important districts and the development of two new mines



Projection of the Uintah Axis across Salt Lake Valley to the Oquirrh Mountains provided a basis for the location of the Bingham Prospect, now a part of the Lark mine of United States Smelting, Refining and Mining Co.

Projective Geology

Upon the basic idea that projective geology would bring in new mines some detailed geologic mapping in the Utah mining districts was undertaken before World War I and in 1919 a study of the regional geology of certain important districts was begun. This study was essentially research in the field of projective geology. Then, as at present, the problem was approached from a practical angle. Early in the study it was apparent that there was a mineralized fissure zone extending from Park City to Alta, traversing the north-south Wasatch Mountains almost at right angles and a decision was reached to find out whether it was definite enough to have a practical value.

A comparison of the U. S. Geological Survey maps of the Park City and Alta regions of Utah with the property maps and production records of the same areas was impressive. The property maps showed the more productive mines to be within an area about two miles wide and eight miles long. The geological maps showed that the zone was parallel to the general course of the intrusive diorites and monzonites. The latter was aligned on a projection of the Axis of the great Uintah Mountain arch which continues from near Park City for 150 miles east to Colorado. Furthermore, there appeared to be no logical reason why the known fissure zone should not continue a mile and a half eastward into an area of unpatented mining claims and ground open for location. In 1920 an engineer was employed to locate some 30 mining claims. Eight years later, several of the original locations and the surrounding claims were consolidated to make up the holdings of Park City Consolidated Mines Co.

Projection of Ore Zones

In the interval between 1920 and 1923 the study was extended to the Bingham Mining District where previous experience in professional geologic work had been gained. A projection of the Uintah Axis across Salt Lake valley to the Oquirrh mountains passed through the southern part of the Bingham Mining District. Structurally, with the geologic information then available, it was not possible to prove a geologic high that would correlate exactly with the Uintah Axis but the alignment of the Bingham monzonite with the Park City, Alta; and Little Cottonwood intrusives seemed to be more than coincidental. When the projection of this axis was plotted on the mining property map of the Bingham District, and the Park City-Alta mineral zones were projected parallel to it, the result was nothing short of remarkable. The Central Zone, two miles in width

(north-south) and three miles long, contained all of the productive part of the large mines of the Bingham District.

The Bingham Prospect a Successful Example

Next came the proposition of finding promising mining property in or near the favorable central mineralized zone. Eventually the property, 350 acres near location No. 2, Fig. 1, was secured largely by lease with options to purchase. Even before this was done the surface geology was studied and, through the courtesy of officials of the adjoining Bingham Mines Co., the geology of that mine was studied. A conclusion was reached that the two most important essentials for ore were present in the area under consideration: (1) On the contact between the Bingham or Weber quartzite and the overlying lava flows the fractured quartzite showed partial replacement by vein quartz. The area was about 100 ft long and 20 ft wide with well-developed quartz crystals up to one-half inch in diameter and two inches long. Under some of the quartz clusters were pyrite pseudomorphs. Although no values were present on the surface or in shallow workings made years before, the quartz did indicate hot mineralizing solutions and the outline of pyrite crystals improved the possibilities for copper, lead, or zinc as it indicated sulphide mineralization; (2) Near the surface outcrop of vein quartz a 150 ft inclined shaft had been sunk by former operators. Although no mineralization was present in the shaft, it exposed the top part of the Commercial or Lead Mine limestone which had been one of the more important ore-bearing limestones in the district.

With these two favorable conditions established it seemed reasonable to expect ore where the channel which carried the quartz went through the underlying limestone. Ordinarily this might not be impressive but being in the Bingham District and well within the projection of the Central Zone of mineralization, an ore deposit seemed almost a certainty.

After minor preliminary prospecting, the Lead Silver Mines Co. was formed to take over the property and options. Active development was started in the old inclined shaft June 22, 1925. The initial discovery of a major ore body was made early in 1928. This was after the expenditure of about \$116,000 and the driving of 5000 ft of exploratory work. Toward the end of the program the company was partially reorganized under the name of the Bingham Prospect Mining Co. The financing of the Lead Silver Mines Co. was by James A. Hogle of Salt Lake City and M. H. Furlaud of New York. The latter wished to discontinue with the financing so the work

was continued under the name of the Bingham Prospect. Thus, to Mr. Hogle goes the credit of financing the venture to a successful conclusion.

Apart from many interesting side-lights, the work conducted on the basis of this theory of projective geology, from the original selection of the site to the proving of a major discovery, bore out the practical value of the basic idea.

Eventually the U. S. Smelting Refining and Mining Co. purchased the adjoining property as well as the Bingham prospect. This was due, not only to the large silver-lead ore body discovered in the Bingham Prospect but to the favorable developments in the adjoining Bingham Mines property that were made since the area was originally studied in the light of the theory of projective geology. The success resulting from the practical application of this theory marked the beginning of a greatly accelerated program of exploration and development in the eastern part of this property resulting in excellent ore discoveries. The increased production of silver-lead-zinc ores in this area has continued from 1926 to the present and was a large contribution to the metal requirements of World War II.

Discovery and Development of Park City Consolidated

After the consolidation of several properties in the eastern part of the Park City District, an extensive exploration and development program of a rather large area was begun. This property was also on the projection of the most favorable mineralized zone but it differed from the Bingham Prospect in that not even a healthy showing of vein quartz could be found on the surface, and it was more remote from other known ore deposits. However, quartz veins up to a foot in thickness could be found intermittently, traversing the Weber quartzite between the Silver King and Park City Consolidated. Through the courtesy of the late M. J. Dailey and others in the management of Silver King Coalition, a study of their veins was made to enable the projection of some of them towards the region under examination.

In addition to the projection of the quartz veins, it was found that favorable limestones underlaid the entire property. The most productive formation of the district, insofar as silver-lead replacement ore bodies were concerned, was the Park City limestone, a formation some 800 ft in thickness. The most favorable horizons in this formation were the limestone immediately above the Janney quartzite—100 ft above the base of the formation—and the limestone at the base of the Park City formation.

With these favorable geologic conditions, the initial financing was ac-



The Bingham Prospect in 1925. A—outcrop of vein quartz. CW—Weber or Bingham quartzite. LF—Lava flows

completed by the sale of stock through brokers in Salt Lake City. It soon became evident that the volume of stock sales was starting to decline just as the mines requirements began to increase.

In 1925, on the basis of a technical paper describing the relationship believed to exist between the mining districts of Park City, Alta, and Bingham* the newly-formed Engineers Exploration Syndicate became interested. An extensive report was submitted and the syndicate came into the venture after an examination of the property. John Hayes Hammond based his approval of the venture on the following data:

- (1) The dividend record of the Park City District to 1927 totalled \$61,335,-585
- (2) Of the above total the neighbor on the south, the Park Utah Consolidated, owned properties that had paid \$34,811,961
- (3) The Silver King Coalition, a mile and a half to the west, had paid \$26,523,624
- (4) The projective geology and formations were right in the Park City Consolidated area.

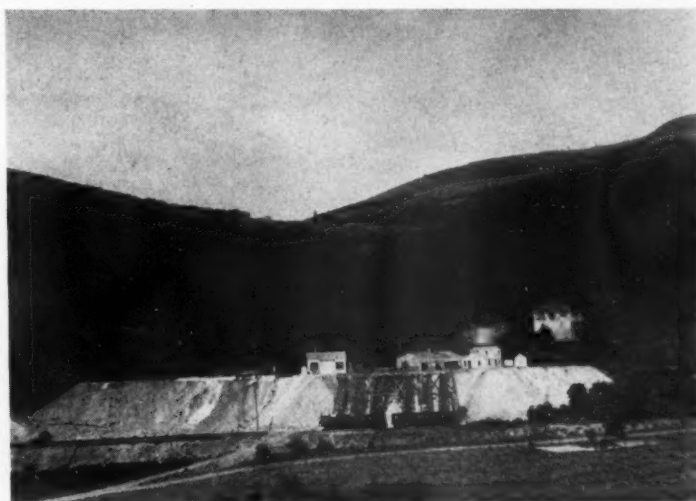
About 300 ft of drifting was done on the adit level to determine the attitude of two faults, which were believed to be mineralized at depth; then a vertical shaft was started. On March 24, 1929, at a depth of 260 ft, one of the faults was cut where it showed one foot of ore assaying from 300 to 500 oz silver. In the months that followed the discovery proved to be the best part of the vein and it

was not until the exploration was carried to the 800-ft level that ore in quantity was encountered. The discovery was in the Silver vein and later two more veins, the Roosevelt and East Crescent, were discovered.

In the 13 years of active operation, the mine produced 532,166 tons of silicious silver-lead-zinc ore which netted smelter returns of \$4,752,750 before mining costs. The mine was closed in August 1942. The low silver price during early operations, and heavy pumping costs during the later, were contributing factors to low earnings. The ores mined were entirely from fissure veins in the Weber quartzite and in this respect the occurrence was

similar to the Ontario, East Park Utah, and Daly veins. No replacement ore was found in the favorable horizons of the Park City formation but such exploration was negligible. In addition to other silicious veins with possibly higher values at better metal prices, there is the possibility of finding replacement ores when the mine is reopened.

Of general interest is the phenomenon that both within and outside the Central Zone at the Park City and Alta Districts, almost without exception, the fissures strike northeasterly. A definite pattern is usually incomplete but there is a tendency toward steep dipping N 15 to 35 E cross fis-



Surface plant of Park City Consolidated Mines Co.

* Mining Districts and Their Relation to Structural Geology, AIME (1925) Vol. 75, 1927.

sures intersecting the main N 55 to 75 E veins. Of the latter there are usually from six to twelve in the Central Zone. Fault fissures with displacements up to 200 ft are not uncommon but major mineralized faults such as the Crescent are rare.

In the past some have questioned the soundness of projecting the Uintah Axis and parallel mineral zones across Salt Lake Valley from the Wasatch to Bingham. Structurally the axis may be farther south but the igneous axis is marked by a row of intrusive outcrops from Shaggy Peak just south of Bingham, almost to Stockton, and the northwest folds of the Oquirrh range are bent noticeably to the west along this line.

Another Projection Problem

From Stockton, Utah, southeasterly another igneous axis is marked by numerous dikes and small intrusives. It forms a mineral zone extending from Stockton through Dry Canyon, Ophir, Mercur, and on to the southeast at least three miles. Projecting this axis S 14 E below the valley wash at the south end of the Oquirrh Mountains and on through the Tintic District it may be seen that this projection is almost parallel to the main ore channels and here again a central zone of mineralization $1\frac{1}{2}$ miles wide and three miles long includes all the large mines of the district except Tintic Standard and North Lily. The alignment of the ore bodies, as well as of the intrusives, is slightly to the west of due north or almost at right

angles to the Bingham-Park City Zone.

The importance of the production in the Bingham, Park City, and Tintic districts within these zones can only be appreciated by a consideration of production records as follows:

The total value of the gold, silver, copper, lead, and zinc production of Utah from 1865 through 1946—according to the U. S. Bureau of Mines—is \$2,791,435,036.

Of this total—

Bingham produced....	\$1,802,426,865 or 64.45%
Park City	
(1870 through 1946)	367,184,321 or 13.13%
Tintic	
(1896 through 1946)	393,526,912 or 14.07%
	91.65%
Other districts.....	\$233,296,938 or 8.34%
Total.....	99.99%

Of the above total probably 95 per cent came from mines within central zones of mineralization not over two miles wide and parallel to certain axes.

Geologic History Forms Basis for Theory

During late Cretaceous and early Tertiary times there were probably two main compressive, mountain building forces in action. The major one was slightly north of due east or parallel to the N 78 E Uintah Axis. It caused many north westerly folds throughout the western mountains and doubtless formed a number of broad north south uplifts. The second and minor force acted in a northerly direction and was initiated later than

the first. Eventually the end stages were contemporaneous. The early stages of the second compressive force formed the Uintah Arch and other roughly parallel structures (north of the Snake River the north-south force may have been not only later but the major force as east-west structures generally prevail). The combined result was numerous domes. During and after their formation there was a deep-seated flow of heat and the more volatile constituents—including mineralizers—moved to the high areas of the domes. This combination eventually formed reservoirs of molten rock rich in mineralizers.

The combined pressure finally exceeded the breaking strength of the formations from the surface down to the deep-seated reservoirs and a sudden but powerful break occurred which shattered or sheared the rocks for many miles, probably forming definite patterns in the form of various angled parallelograms all having a definite relation to the applied forces. The final effect was probably to warp these parallelograms at their boundary intersections and reopen the shear or shatter zones along them. Usually these zones are faults of minor displacement. Major mineralized "Basin-Range" faults such as those of the Comstock and Getchell mines are occasionally found in the area between central Nevada and the Sierra Nevada range but farther east they are seldom found.

It is probable that the first breaks formed channels for release of igne-



Looking west from Delamar, Nev. Note broad arch in desert range to the west. A similar east-west arch forms part of the structure of the Delamar district

ous material from depth, as dikes filling the fissures. As the vulcanism subsided, recurrent pressures reopened the fractures along the previously-formed patterns and mineralizing solutions were released to form mineral deposits along the fissure zones in many places and in particular at magmatic highs in the vicinity of intrusives of moderate size.

In other words the igneous material and mineralizers will accumulate much like oil in an oil field but at much greater depth, probably so shallow as ten miles or as much as fifty miles. Both the igneous material and mineralizers may be eventually released by fissures which extend deep enough to tap these reservoirs. Also magmatic stoping undoubtedly plays an important role. The igneous material and mineralizers are present in the form of a solid solution in a comparatively large area so that the mineralizing solutions do not escape in volume with the first lava flows at the beginning of an intrusive period. They eventually accumulate in the magma after the first intrusive period has come to a close. Then, through the process of magmatic differentiation, the mineralizers concentrate in the dome and below the solidifying intrusives at progressively greater depths below the surface. In time the concentration may become so great that wide-spread replacement of the overlying intrusives takes place with the formation of such deposits as the Utah

Copper and other disseminated porphyry coppers of the Southwest. Again the mineralizing solutions may escape to the surface through fissures in the intrusives and surrounding rocks. This mineralization, of course, may be more intense and in greater volume where the fissured zone is near a structural magmatic high caused by doming, faulting, and/or magmatic stoping.

Applied Projective Geology

In the case of the well-known, major mining districts, the methods used in the present instance are not entirely unique, as others have employed part of them in the past and more operators and engineers will use them in the future. However, in the isolated districts, the chances of finding more ore along the trend of known occurrences or even new mineralized areas will be greater if the geology has been mapped and the general region considered as a basis for projective geology. The Delamar District of south-central Nevada is a good example. Here the geology was mapped by the Nevada State Bureau of Mines in cooperation with the U. S. Geological Survey and the results published in University of Nevada Bulletin No. 5 of December 1, 1937.

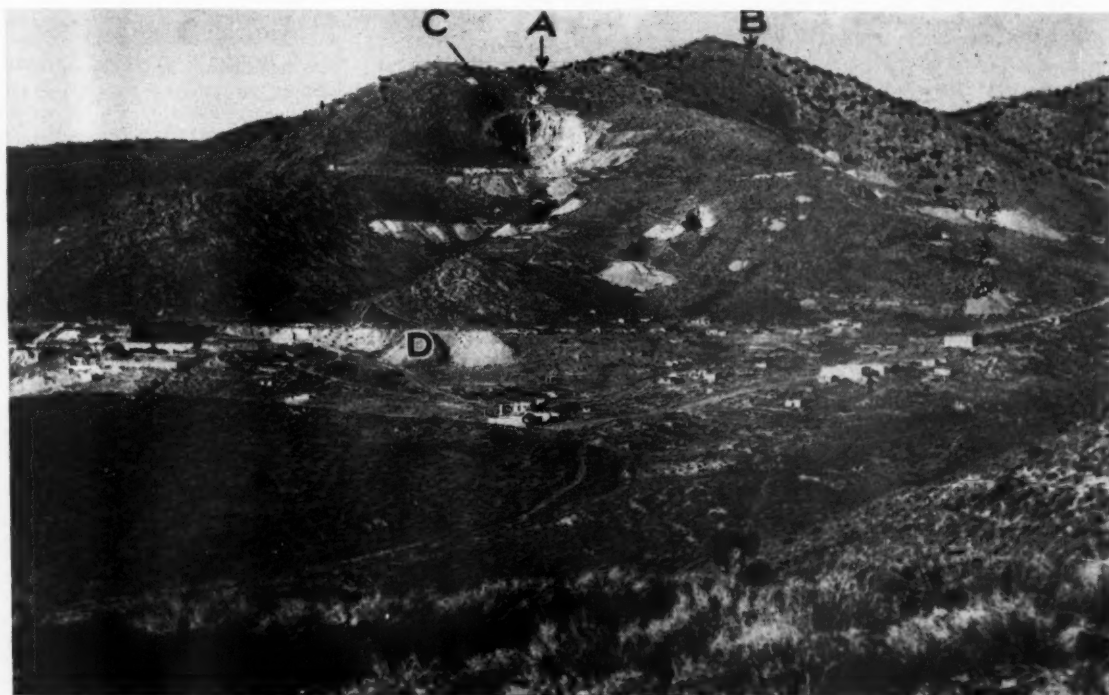
The regional geology shows two east-west rhyolite dikes marking the approximate structural and topographic axis of an east-west uplift

that crosses the northerly trending Meadow Valley mountains. The north-south Delamar vein crosses and faults the rhyolite dikes and is occupied by a basalt dike. The mineralization is later than the early rhyolite and basalt and older than the latest rhyolite, thus it is intervalcanic.

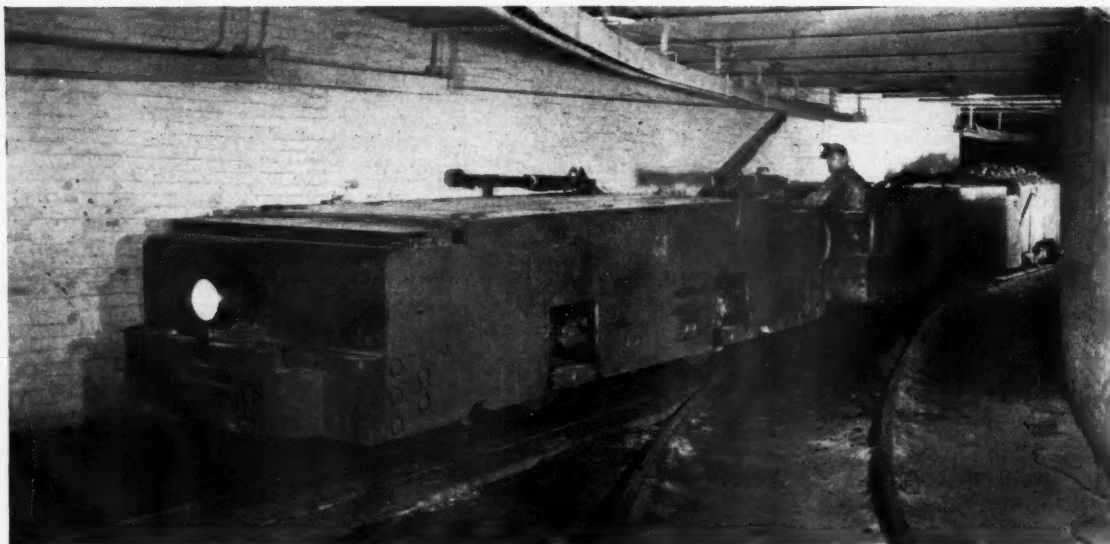
The interesting part of the Delamar Mine in the present consideration is that the larger part of the \$13,000,000 gold (including minor silver) production of the district came from the Delamar vein not far to the north and south of the igneous axis near the top of the structure. A smaller part of the production came from a parallel vein near the same rhyolite dikes, thus indicating mineralization along a structural high and suggesting the possibility of finding other ore occurrences where north-south faults or veins cross the rhyolite dikes to the east and west of these two veins. Also, favorable prospecting areas lay to the east and west of the Delamar area along structural highs.

Looking northerly in Fig. 6, the Delamar vein may be seen where it passes over the summit. Just below this point is the glory hole which is about 300 ft wide and 400 ft long and straddles the Delamar vein and its intersection with one of the rhyolite dikes. From this glory hole was mined a large tonnage of low grade gold ore which was drawn out through a raise from the No. 10 or Mill Tunnel

(Continued on page 54)



Looking north at a part of the Delamar mine. A—Delamar vein. B—April Fool vein. C—Glory Hole straddling Delamar vein where it crosses and faults rhyolite dike. D—Mill tunnel level. Country rock is Cambrian and Precambrian quartzite



Reducing Mine Haulage Accidents

A Study of Individual Company Records Operating in Several States Shows How Haulage Accidents Occur and What Methods Are Being Used to Prevent Them.

*A Report of
the Safety Committee*

IT seems to be fairly well established that underground haulage constitutes one of the major sources of coal-mine accidents. Certainly, statistics covering the entire coal industry, as well as figures for the several states, all point in this general direction. It is equally well established that underground haulage accidents can and are being reduced. This is evidenced by the records of a number of mining companies who have studied their transportation hazards and have

made intensive efforts to eliminate or at least to correct them. The over-all picture was discussed in a Safety Committee report published in the October 1947 MINING CONGRESS JOURNAL. The individual company experiences showing the way toward haulage safety are given in the report presented here. This consists of actual accounts as furnished to the committee by large coal producers in the competitive market, operating in the several major fields as hereinafter described. These tell their own story.

from weak power or the loss of power, causing trips to run back on grades, have been reduced by the use of rectifiers located at strategic points and by automatic breakers on each section. The installation of heavier trolley wire and the extension of feeder lines have all contributed to maintaining constant power at proper voltage.

Mechanical failures that have caused numerous haulage accidents are being overcome by having at each mine a repair shop with pit and up-to-date equipment. Locomotives may be brought here for immediate repairs to brakes, controllers, armatures, or any other defect that the motorman may detect. Spare units are maintained so that there will be no loss of production while a locomotive is in the shop. The motors are checked regularly and defects corrected before becoming serious.

The track haulage system has been greatly improved. Grades were reduced; heavier rails were installed; proper curves were made at each cross entry; the roadways shot for clearance, and safety holes placed at regular intervals along the haulageways.

REPORT OF COMPANY "A" Operating in Southern West Virginia

HAULAGE accidents result from many causes but in our case we make two general classifications—those caused by equipment failures and those caused by human failures. The first class includes accidents resulting from power failures, breakdowns of locomotives and other rolling stock, and by bad track. The second class covers the failure of employees to work safely or to operate equipment safely. A brief outline of the

experience of our company in reducing haulage accidents follows.

Equipment Failures Corrected

In the first classification, power failures are beyond the control of the motor crews, and when occurring at the source are beyond the control of management, but failure inside the mine from the substation is usually controllable. Accidents which result

The generous application of rock dust has greatly increased visibility; lights are placed at each switch and telephone, and as far as possible, parallel-throw switches have been installed. Accidents caused by cars breaking loose in the side tracks and running out onto the main haulageway have been eliminated by trip chains and hooks. The miner at the face is furnished with a safety dog which is placed on or against the car wheel once the car has been properly spotted.

Then, with adequate power, properly maintained equipment, and good track, it was necessary to install still further aids to prevent human failures. Collisions have been practically eliminated by having a dispatching system with telephones on each section, where the motor crew is instructed when and where to go. A number of accidents were due to the motor crew failing to push trips in the sidetracks far enough to clear the main entries. This failure has been eliminated by hanging signs from the roof at the proper clearance point in each storage track. Brakemen have been furnished whistles to signal the motorman, and each man understands the code so that no trip is moved one way or another without the proper signal. The number of cars on each trip has been cut down so that the motorman can keep his brakeman in sight at all times. Crews have been fully instructed that no one is allowed to ride between cars, on the front end of locomotive or cars or on top of locomotive or loads. They have been further instructed that coupling or uncoupling shall not be permitted while the motor or cars are in motion.

Human Failures

As far as possible, our company has taken advantage of new developments in equipment and in safer mining methods and has given greater care toward the education of haulage crews. Yet the human element still remains a serious factor simply because no one can foretell what an individual may do under even normal circumstances when left to his own thinking. In spite of all the improvements that have been made in the locomotives, in the power supply, by heavier and better track, lighter grades, easier curves, proper dispatching, better vision, reduced haulage speed, thorough and constant instructions, and careful inspection of equipment, accidents continue to occur—primarily due to human failures. These originate in the mind of a worker when he cannot or does not keep his mind on his job. There are numerous contributing factors: financial worries, family troubles, wrong living, neighbor troubles, worry over an infraction of the law, labor unrest, and many others. When a man obtains his lamp at the start of the shift,

TABLE I—MINE "A"
CLASSIFICATION OF HAULAGE ACCIDENTS FOR FIVE-YEAR PERIOD 1943-1947
A Group of 12 Mines with an Annual Production of 4,000,000 Tons

Cause	Total Accidents	Percentage of Total
Coupling cars and motors.....	136	30.23
Derailments	87	19.33
Getting in or out of cars or motor.....	60	13.33
Caught between car and post.....	33	7.33
Caught between motor or car and roof.....	25	5.56
Trailing cables	19	4.22
Caught between car and face or rib.....	16	3.56
All other causes.....	74	16.44
	450	100.00

TABLE II—MINE "A"
COMPARISON OF HAULAGE ACCIDENT RECORDS
At Three Mines Using Different Operating Methods

	Mine 1 100% Mechanical	Mine 2 50% Mechanical	Mine 3 Hand and Mechanical
Total men employed inside and outside.....	465	489	331
Number of men on haulage.....	57	60	49
Number men—other occupations.....	408	429	282
Percentage men on haulage.....	12.26%	12.27%	14.81%
Percentage men other occupations.....	87.74%	87.73%	85.19%
Number of all accidents.....	12	68	33
Number of haulage accidents.....	1	19	4
Number of all other accidents.....	11	49	29
Percentage haulage accidents.....	8.33%	27.93%	12.12%
Percentage all other accidents.....	91.67%	62.07%	87.88%

he may outwardly appear normal, but no one can say what frame of mind he is in. It is only after an accident has occurred that we learn he should not have been allowed to work that shift because one or several of the above conditions were preying on his mind and he could not think straight nor perform his work as he normally would.

Haulage Accidents Records

In the past five years the employees of our company have worked a total of 4,462,686 man days, and during that period there were reported 2354 compensable accidents, or an accident for every 1895.78 man days worked. Of the 2354 compensable accidents, 450 (or 19.11 per cent) were directly chargeable to haulage. In analyzing the records—see Table I—we find that coupling or uncoupling cars cause 30.23 per cent of haulage accidents, getting in or out of trips cause 13.33 per cent, derailments cause 4.22 per cent, caught between car and post or doors cause 7.33 per cent, caught between car and face or rib cause 3.56 per cent, caught between motor or car and roof cause 5.56 per cent, while all other causes, such as falling out of motor, struck by trolley pole, etc., take up the remaining 16.44 per cent. We fail to find that new or inexperienced men at our mines are the accident factors, for our records show that the injured men had an average of eight years' mining experience on their own jobs.

A study covering three types of mining in which our company is now engaged has been made. One mine is 100 per cent mechanized and the other two are about 50 per cent mech-

anized. All use track haulage, but in the mechanical mine the coal is brought from the face to the room entry by conveyors and the motor does not go into the working place. We find, as shown in Table II, that in the mechanical mine—No. 1—of all the men employed, 12.26 per cent are on haulage and they account for 8.33 per cent of the total compensable accidents. The remaining 87.74 per cent of the men account for 91.67 per cent of the accidents. In No. 2 mine, that is about half mechanical and half hand loading, of all the men employed, 12.27 per cent are on haulage and account for 27.93 per cent of the compensable accidents. The remaining 87.73 per cent of the men account for 62.07 per cent of the accidents. This indicates that on motor haulage where the motors go to the working faces the accident hazard is increased, in this comparison, by 19.60 per cent. Part of this can be accounted for by the fact that, in the mechanical mine, the haulage exposure is greatly reduced by the shorter hauls and better haulage conditions. However, at No. 3 mine, comparable to the one previously mentioned where mechanical and hand loading are about even, an intensive safety campaign has been under way for the past three years which has produced excellent results. Of the total men employed there, 14.81 per cent are on haulage and account for 12.12 per cent of the accidents. The remaining 85.19 per cent of the men account for 87.88 per cent of the accidents. This record clearly demonstrates that haulage accidents can be reduced if enough time and effort is expended and the men are brought to a frame of mind where they strive to obtain safety.

REPORT OF COMPANY "B" Operating in the Anthracite Region

TRANSPORTATION hazards are numerous at our anthracite operations because some mines work eight and ten beds of coal, necessitating underground slopes and planes up and down which mine cars must be hauled. In the nine-year period 1939 through 1947, we had 21 inside transportation fatalities and 18 of these were due to disobedience of existing company safety rules or Anthracite Mining Laws. In fact, that is true of most of our fatalities and the answer is closer observation by our mine officials for safety hazards, the application of just discipline to offenders of such safety rules, and the cooperation of both the workmen and the UMWA. We had no transportation fatalities in 1947 due to our safety inspectors paying particular attention to the need of head blocks and runaway latches and the application of summary discipline by our section foremen.

Following is a brief summary of the 21 transportation fatalities, together with the causes and our comments:

Men at face did not go to safe place while cars were changed—four fatalities

Our rules require transportation men to notify the miners at the working faces that they are coming to pick up the loaded cars. Such notification must be given before the headblock is taken off the rail leading to the working face or the runaway latch is closed. The men at the face must cease work and go to a safe place.

Employees riding cars without permission—four fatalities

Only transportation employees are allowed to ride locomotives or cars. The fatalities were other than transportation men "sneaking" rides.

Struck by derailed cars—three fatalities.

- (1) Derailment caused by prop butt lying along tracks.
- (2) Brakeman standing with back to moving trip.
- (3) Cause of derailment unknown.

Most derailments are caused by bad track or mine cars in bad condition. We make special effort to keep tracks in good condition and have up-to-date car-repair shops. Rules specify that haulage roads must be kept clear of timber, etc., and transportation men are cautioned to watch moving cars.

Standing cars not blocked at loading point—two fatalities

All empty cars at the loading point must have a drag placed on the first car.

Wire rope broke handling cars on plane—two fatalities

Ropes on inside slopes and planes must be examined daily by transportation men and occasionally by mine foreman.

Pushing trip of cars, one uncoupled—one fatality

The electric locomotive engineer pushed the trip over top of grade and did not wait, as per instructions, until brakeman had removed headblock.

Electrician running motor without permission—one fatality

Company rules and mining laws require that no one except transportation men may handle cars without permission from mine foreman.

Operating locomotives too fast—one fatality

Company rules and mining laws

state that speed of locomotives shall not exceed six mph.

Repairing locomotive with trolley pole on wire—one fatality

When repairs are being made to an electric locomotive, company rules state that the trolley pole must be lowered from the wire or the reel cable disconnected from the wire. After this fatality, the rule was amended to read that when a locomotive is left standing, the motorman must remove the reverse lever from the controller.

Struck by loose lumber on top of car—one fatality

Company rules state that all materials moved on a truck or on top of cars must be securely fastened.

Insufficient clearance—one fatality

Company rules and mining laws state that there must be at least 2-ft clearance between sides of mine cars and ribs or timber on each side of the track.

REPORT ON MINE "C" Operating in Western Pennsylvania

IN the seven-year period from 1940 through 1946, this company operating several mines with an annual average production of over 6,000,000 tons, had 59 underground fatalities. Of this number, 25 were caused by roof falls and 20 by haulage, but of these 20, only nine men were haulage employees; the remaining 14 were engaged on other work. But as will be seen from the summary given below, whatever the work classifications, the fatalities were, with few exceptions, caused by what report "A" terms

"human failures," inattention, doing the wrong thing, or disregarding safety rules.

Causes of Haulage Fatalities

Man found underneath mine car trip—circumstances unknown.

Man found on haulway—run over by locomotive; circumstances undetermined.

*Brakeman rerailing loaded car was crushed against rib.

Miner apparently mistook a supply

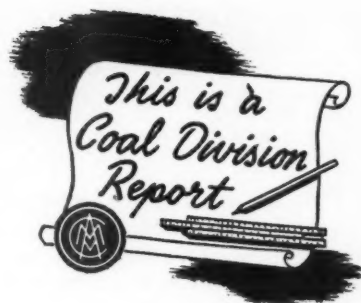


Low coal and slate falls increase the haulage hazards

- motor—threw room switch and was caught at face by car.
- *Gathering motorman had head-on collision with main-line locomotive. Miner drilling hole in rib on side track was run over by pushed cars. Man fell off rear of locomotive and was run over by following motor.
 - *Motorman electrocuted—definite facts unknown.
 - *Brakeman running in front of trip to throw switch, fell and was run over by pushed cars.
 - *Motorman crushed in collision with derailed car in working place.
 - *Motorman stumbled against trolley wire—electrocuted.
 - *Motor jumped track, knocking out

- 60-lb rail crossbar—motorman crushed.
- *Motorman misunderstood signals; caught in head-on collision. Shuttle-car operator reversed car and was caught against rib. Shuttle car "lurched" against rib, crushing worker.
 - Miner in room struck by gathering trip which accidentally entered his working place.
 - Riding on side of car, struck against crossbar.
 - Riding on loaded trip, fell off and was run over.
 - *Brakeman electrocuted by trolley wire crossing between car and motor.

* Haulage employees.



REPORT FROM COMPANY "D" Operating in Southern West Virginia

BASED on our own studies and experience, the following recommendations are offered as means to reduce coal-mine haulage accidents:

Locomotives now have inadequate seating space for the motorman and brakeman; this should be corrected in future designs. There should also be provided better stirrups, steps, and handholds.

More consideration should be given to having the proper relationship between size of locomotive,

length of trips, grades, and heights of seam.

Better couplings should be designed for use between locomotive and mine car.

Mine cars of different design and with bumpers of different heights should not be used in the same trip.

Strict maintenance should prevent the use of defective coupling links, pins, and mine car bumpers.

Trip movements should all be controlled by a central dispatcher.

Motorman and brakeman should be properly trained.

Cars should not be coupled or uncoupled while in motion.

Mine track lay-out should be planned to eliminate need for pushing trips ahead of locomotive.

Brakeman should be prohibited from riding front end of mine cars and should be provided with a detachable seat for riding the rear end.

Proper consideration should be given to track alignment, surfacing, and particularly to the maintenance of switches and turn-outs.

REPORT FROM COMPANY "E" Operating in Western Pennsylvania

OUR mine, which is completely mechanized with an average annual production of 1,500,000 tons, during the period of 1938 through 1946 had 104 lost-time haulage accidents and five haulage fatalities. These occurred as follows:

An empty car being pushed into a room derailed and pinned a utility man against rib.

Motorman jumped out of his motor in motion and ran ahead to throw a switch, tripped and fell.

A brakeman riding on top of the locomotive was crushed when the motor derailed.

A motorman had his head caught between a guard on the locomotive and a low timber.

A trackman standing in front of (and not back in) a shelter hole

along the main haulage was crushed against the side when the cars derailed.

From our experience, it seems the best way to improve haulage accidents is through good track installation and maintenance, as well as complete maintenance of all rolling stock. Dispatching should be supplemented by trolley phones, block signals, and automatic switches where warranted. Our haulage crews are trained by the foremen or dispatchers and are also closely supervised.

REPORT ON MINE "F" Operating in Central West Virginia

OUR company, with an average annual production of approximately 1,000,000 tons, had a total of 75 lost-time accidents during the year 1947, as follows:

Haulage	15
Conveyors	21
Roof falls	11
Electricity	4
Miscellaneous	24
	<hr/>
	75

There were no haulage fatalities; of the 15 haulage accidents, 12 occurred underground, as summarized briefly below:

Brakeman injured hand coupling cars.

Motorman attempting to turn trolley pole while locomotive was in motion was caught against mine roof.

Brakeman crushed finger coupling cars.

Brakeman coupling cars while in motion had foot caught when one bumper rode up over the other.

Slate loader injured when attempting to scotch a trip of loaded cars that were in motion.

Motorman injured when locomotive derailed.

Brakeman riding empty car on

tramroad was injured when trolley pole jumped wire, knocking down a crossarm.

Slateman injured hand while coupling cars.

Laborer was riding mine locomotive when trolley pole jumped wire; the support was torn down, striking him on head.

Brakeman failed to remove a scotch under a car wheel; his hand on top of the car was caught against the roof when the wheel rode up over the scotch.

Motorman caught arm between bumpers when attempting to couple two locomotives.

Motorman permitted locomotive to get out of control and injured leg jumping off while it was in motion.

Projective Geology

(Continued from page 49)

level. Large bodies of ore were also mined along the Delamar vein to the north and south of the glory hole. The position of the April Fool vein is also indicated on the photograph.

The Future of Projective Geology

In the future, projective geology might be greatly extended to the point where distances in the hundreds of miles are not beyond the realm of consideration. In the first place, we have the Mother Lode District of California which has been definitely proven for a distance of 125 miles. Also the mineral belt extending across the state of Colorado in a northeasterly direction from Rico to Boulder, a distance of 220 miles.

We could go on to expand the idea by including the great volcanic arcs that border the Pacific from Australia through the Philippines, Formosa, Japan, the Kurile Islands, the Aleutians and on the mainland bordering our coast line from Alaska through British Columbia and down through the Cascades of Washington and just east of the Sierra Nevadas of California. Most of these islands are volcanic and there are many active volcanoes among them. In Japan, for instance, there are 165 volcanoes, of which 62 were considered active in 1902. In general these volcanoes form the arc. Additional volcanoes are on the concave side of the arc, as are most of the gold and silver deposits. The copper deposits appear to be largely along the high projections on the convex side of the arc.

Within the United States the volcanic activity of more recent times is not as extensive as in the Pacific, generally being represented by Mt. Rainier, Mt. Hood, and Crater Lake in Washington and Oregon and Mt. Lassen and other recent volcanoes on the east side of the Sierra Nevadas. Ore deposits near this line of volcanoes have not been found in sufficient numbers to warrant drawing general conclusions as to their relation with respect to volcanic axes or zones. Doubtless the volcanoes follow fault or shear zones and with a rather remarkable alignment. The extent of the volcanic islands is measured in thousands of miles, thus the projections of igneous or mineralized zones a hundred miles or more does not appear at all improbable.

Similar arcs to these but with their convex sides facing eastward delineate the Colorado Plateau and extend on through Utah, Montana, and into Canada. In general, the major copper deposits are not far from the western boundary of this plateau. This boundary in southeast Nevada

and Utah represents the approximate position where an extensive belt of overthrusts from the west come to the surface. The structure below these flat-dipping overthrusts, and at great depths, and along the boundary of the plateau, probably formed an uplift where copper-bearing mineralizers accumulated in comparatively great volume. Their concentration was probably further localized by the easterly - westerly doming described and their escape toward the surface came through a broad pattern of intersecting fractures or shear zones which were in general shatter zones or faults of small throw. East-west structures appear to be especially favorable at Butte, Bingham, Park City, Coeur d'Alene, Ely, Inspiration, Miami, and in other districts, probably due to the less compressive stresses

in a north-south direction. This uplift appears to account for the distribution of the principal copper districts in Arizona, Utah, and Montana, leaving Ely, Nevada, and Ajo in Arizona as anomalies, being farther west of the plateau than other areas. At the time of mineralization the country west of the plateau boundary was under erosion and higher than the plateau area, and this must be considered in interpreting the geology of the past.

Here have been cited two examples where new mines were brought in as a direct result of projective geology. Many scattered districts throughout the country could benefit from discoveries made by the broader application of projective geology. Today the projection of known mineral belts is in miles, tomorrow it may be in hundreds.

Mining and Leaching Secondary Copper

(Continued from page 33)

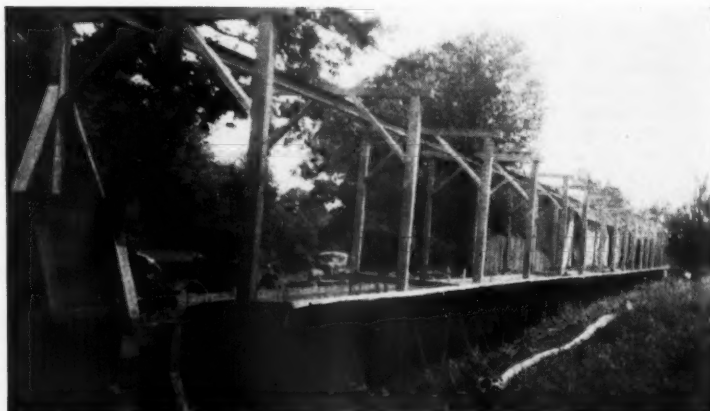
both sides of the launder onto which the cement copper is shoveled to partially drain before going to the dryer. A trolley, running on a 6-in. I beam is equipped with a half-ton traveling chain block. It overhangs the launder and serves to deliver the iron for precipitation and to take away the cement copper. The trolley curves at right angles into the dry house, where the cement copper is delivered to a home-made, flat-top dryer.

When dried, the cement copper is put through a ½-in. screen, and then run over a magnetic belt for beneficiation by removal of any unused iron. The cement copper is then bagged in double-walled bags, 100 lb per bag, and shipped to Carteret, N. J., for smelting. With care in the separation, 70 to 80 per cent copper ship-

ments are average. Up to this time, the precipitant has been baled, detinned scrap from canning factories. These bales purchased in New Jersey have a density of 65 per cent and must be emasculated at a cost of 1c per lb.

As a result of trials made with lower cost machine turnings procured from industries within a radius of 40 miles, a higher grade of cement copper can be made. When low-temperature reduced iron, or sponge iron made from the gossan ores is available, it will be used, as tests have proven sponge iron to be the most satisfactory precipitating agent.

Present tonnage of 30 tons per day at Toncrae is from development work. Present operations may be regarded as research for application in a broader way in the future. Proposals are under study to recover the iron from the waste iron sulphate solution as Fe_2O_3 and to reduce this by rotary kiln processes to supply an expanding market for powdered sponge iron.



Cement copper is precipitated in this launder



WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

THE sun was high when the Congress adjourned at 7:15 Sunday morning, June 20, after a grueling 44¼-hour session which began at 11 am June 18. Immediately Senators and Representatives dashed for Philadelphia where majority party members participated in the Convention which brought forth the Dewey-Warren ticket for the November 2 election.

With the selection of 32 Senators and 435 Representatives in the balance, there is speculation as to whether the present majority party will retain control of both Senate and House. There is also discussion regarding possible shifts in Committee Chairmanships, even though the control of Congress may remain as at present.

On June 19 the House passed the Knutson Tax Revision bill, discussed in the June Journal. This measure, which is devoted to administrative amendments, now rests in the Senate Committee on Finance. If a special session of the Congress is called this Fall, it could be enacted, otherwise its major features can be included in a general tax bill in the 81st Congress.

Trade Agreements Extension

On July 26 the President signed a bill extending the Foreign Trade Agreements Act to June 30, 1949. The legislative course of this measure in both House and Senate had been marked by bitter wrangling. Stating that there was "no valid reason" for the one-year limitation "which appears to cast some doubt upon our intentions for the future," the President criticized what he termed "a new, complicated, time-consuming and unnecessary procedure for the negotiation of reciprocal trade agreements." He said, however, that he will do his best to make the new procedures work.

The bill directs the Tariff Commission to investigate proposed trade concessions and recommend to the Presi-

dent limits beyond which tariff rates should not be raised or lowered. The President is required to report to Congress his reasons for any change beyond the recommended rates. He may not lower any rate by more than 50 per cent of that in effect on January 1, 1945, nor increase any rate by more than 50 per cent over that in effect on June 12, 1934, nor transfer any article between the dutiable and free lists. It is required of the Tariff Commission that the criterion used in setting a floor for duties is to be "serious injury to the domestic industry," rather than "serious injury to domestic producers," as set forth in the House-approved version.

The President has also approved bills (1) suspending until July 1, 1949, duties on lead-bearing ores, flue dust and mattes of all kinds, lead bullion or base bullion, lead in pigs and bars, lead dross, reclaimed lead, scrap lead, antimonial lead, and antimonial scrap; and (2) continuing through June 30, 1949, the suspension of import duties on scrap iron, scrap steel, and non-ferrous metal scrap.

Incentive Payments

The Russell (Rep., Nev.) bill, discussed last month, which would have provided "conservation" payments and also exploration payments for metals and minerals, was kept from House floor consideration by the Committee on Rules. On June 14 the Committee voted five to four to table the bill.

Advocates of the Russell bill immediately sought action in the Senate, with the result that the Committee on Interior and Insular Affairs on June 16 reported a bill by Senator Malone (Rep., Neb.). The Malone bill would provide for development and conservation payments for all ores, metals and minerals determined to be critical under the Stockpiling Act of 1946, and included in Group A of the January 1948 Munitions Board list of strategic and critical materials. In

Washington Highlights

CONGRESS: Adjourned June 20.

TRADE AGREEMENTS: Act extended for one year.

INCENTIVE PAYMENTS: No bill passed.

GOLD: Canada encourages production.

"LEASERS": Congress overrides Gearhart bill veto.

RENEGOTIATION: Raw materials exempted.

OVERTIME-ON-OVERTIME: Supreme Court upholds.

WATER POLLUTION: White House approval anticipated.

COAL: Strike fears calmed.

the case of small mines where production is less than 300 tons of recoverable metal per year the maximum payments would be made on the total production.

A more complete measure than the Russell bill, the Malone bill established exploration payments, in addition to the development and conservation payments, based on production of recoverable metal for each mine operation, at maximum rates of 7c per pound for the first 250 tons of metal produced in any calendar year and reducing by 1c per pound for each succeeding 250 tons to 2c per pound for the sixth 250 tons. For production in excess of 1500 tons and less than 2000 tons the maximum exploration payment would be at the rate of 1½c per pound. The bill provided a four-year program and authorized \$80,000,000 annually for incentive payments.

After six hours of intermittent debate the Malone bill was laid aside after daylight Sunday morning, June 20, shortly before the final adjournment. During the debate, amendments by Senator Malone were accepted which would have reduced the payments authorization from \$80,000,000 to \$60,000,000 and limited the life of the Act to three years. Assisting Senator Malone were Senators Millikin of Colorado, O'Mahoney of Wyoming and McFarland of Arizona. Opposing

the measure were Senators Kem of Missouri, Tydings of Maryland, Williams of Delaware, Ball of Minnesota, Saltonstall of Massachusetts and Green of Rhode Island. These latter Senators stressed the lack of endorsement of the bill's objectives and terms by the Department of the Interior, the National Security Resources Board, the Munitions Board and the Department of National Defense.

Previously the Department of Interior had informed Congressional leaders that none of the pending bills were properly devised to accomplish the production and exploration program intended. The Department submitted the draft of a proposed measure for stimulating exploration for future production, while utilizing existing procedures for the stimulation of production currently. It is understood that this draft contemplated contracts for exploration payments, which could not exceed 50 per cent of actual exploration costs nor exceed \$500,000 to any one producer in any one year. Such contracts would be limited to three years and could not extend beyond June 30, 1953. Also contemplated were contracts with domestic producers for purchases of strategic and critical minerals at above-market prices.

Meanwhile the Congress has appropriated \$600,000,000 for purchases for the stockpile, \$300,000,000 of which is for contract authorizations.

Canada Encourages Mining

The Canadian law to encourage gold mining by reimbursing producers to the extent of 50 per cent of the cost of production in excess of \$18 an ounce became effective June 15 (retroactive to January 1). As charges against production costs the regulations under which the law is administered include operations costs; pre-production costs and depreciation up to 15 per cent per annum; and exploration and development expenses required to maintain ore reserves up to three years or sufficient to maintain reserves at the ratio which existed at the beginning of 1948.

The regulations provide that no mine shall receive assistance payments until it keeps suitable books and produces more than 50 troy ounces of gold annually, which gold must represent 70 per cent or more of the total value of the products of the mine. Capital exploration and development costs which the mines may add to their cost of production are defined to include expenditures on shafts, stations, underground crusher and pumping stations, main haulage ways, ore and waste pockets, and other development work designed for continuing use. Such work must be capitalized and the expenditures amortized generally at the rate of 15 per

cent per annum. Provisions are made for assisting mines that suspended operations, when suspension was beyond the control of the operator. Advance payment of assistance on a quarterly basis is provided up to 80 per cent of the estimated amount the mine would be entitled to receive.

Independent Contractors

The Senate on June 4 passed the Gearhart (Rep., Calif.) bill, H. J. Res. 296, which prevents the Treasury from extending the Social Security payroll tax to apply to independent contractors such as mine "leasers." On June 14 the President vetoed the bill, charging that it would block old age and unemployment insurance coverage for many commission salesmen, piece workers, truck and taxi drivers, miners and others. The Senate and House promptly overrode the veto by votes of 65 to 12 and 297 to 75, respectively, thus maintaining the current status under which mine "leasers" are excluded from the definition of "employees."

Approved by the House in the last days of the session, a Social Security bill by Representative Reed of New York extends Federal old-age and survivors' insurance to employees of states, counties, municipalities, certain agricultural processors, and charitable and church institutions, at their employers' option. The measure prohibits coverage of those not considered employees under usual common law standards, thereby eliminating salesmen, independent contractors and leasers. It would also permit beneficiaries to earn up to \$40 a month without disqualifying themselves for payments. Present limit on earnings is \$15. In addition, maximum payments to the first child of a deceased worker, now limited to 50 per cent of the amount to which the worker himself is entitled after retirement, would be raised to 75 per cent.

Renegotiation

The wartime contract renegotiation provisions, enacted in the big Air Force appropriation bill as discussed last month, have been designated as the "Renegotiation Act of 1948." Congress, when approving the Second Deficiency Appropriation bill before the recent adjournment, included a provision extending this Renegotiation Act of 1948 to any contracts for the procurement of ships, aircraft, aircraft parts, and the construction of facilities or installations outside of the Continental United States entered into by the Army, Navy, or Air Force. This application is made discretionary with the Secretary of Defense and is limited to the types of contracts specified. The exemption for mineral raw materials which was placed in the original 1944 Renegotiation Act is ex-

tended in both of the recently enacted laws. It excludes "any contract or subcontract for the product of a mine, oil or gas well, or other mineral or natural deposit, or timber, which has not been processed, refined, or treated beyond the first form or state suitable for industrial use."

This exemption is valuable not only to mineral producers but also to manufacturers of mining equipment, whose sales to mines are thus made non-renegotiable.

Overtime-on-Overtime

Concern is felt by employers in a number of industries because of the U. S. Supreme Court decision of June 7, that overtime pay claims of New York longshoremen did not amount to "overtime-on-overtime" but rather would be regarded as overtime on premium pay for work at inconvenient hours.

Immediately the House Judiciary Committee was asked to report a bill by Representative Goodwin (Rep., Mass.) which would ban overtime-on-overtime payments. The Committee declined to act until they had further indications of the attitude of the Senate. A Senate Judiciary subcommittee, consisting of Senators Donnell (Rep., Mo.), Cooper (Rep., Ky.) and Eastland (Dem., Miss.), considered a companion measure to the Goodwin bill, introduced by Senator Wiley (Rep., Wis.), and agreed to hold extensive hearings at the next session of Congress.

After the Congress had adjourned, the Department of Justice on June 21 made a request of the Supreme Court to reconsider its ruling of June 7, contending that it "is not only erroneous, but its application will be virtually impossible in some industries."

The Government asserted that (1) the factual foundation for the Court's decision "is incomplete or inaccurate" and gives an effect "which is unintended and undesirable;" and (2) management and labor seem unable to reconcile the decision with the hitherto accepted principles governing overtime payment, and "fear that they are facing confusion detrimental to both." The petition was accompanied by letters from the Army, Navy, Maritime Commission, AFL longshoremen, and a number of shipping associations.

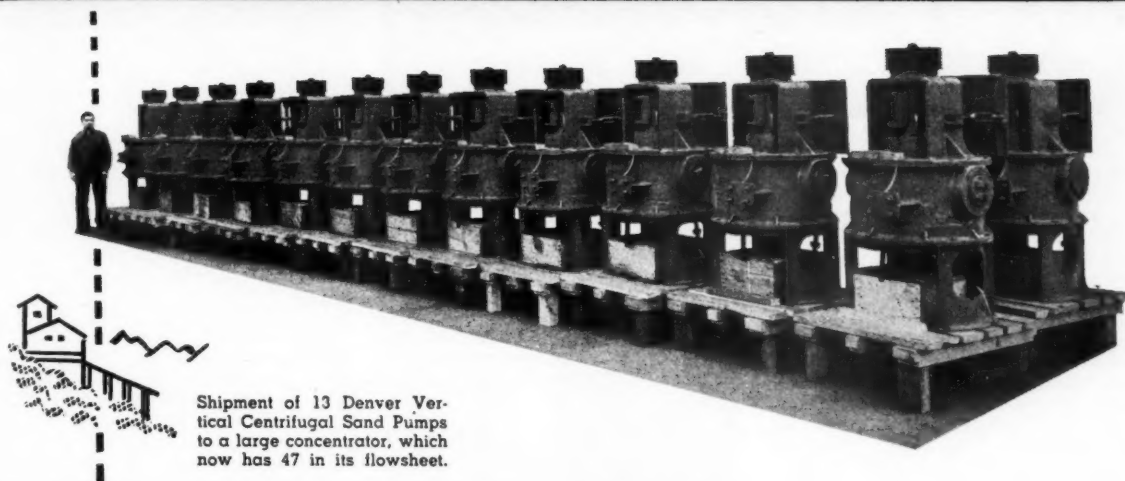
Water Pollution

Passed by the House on June 14, the Taft-Barkley Water Pollution bill, S. 418, with only minor changes made by the conferees, was approved by the President on June 30.

The measure authorizes State compacts for prevention and abatement of pollution, and pollution of interstate waters endangering health or public welfare is declared to be a pub-

(Continued on page 72)

WHY LARGE COMPANIES USE . . . **DENVER Vertical Centrifugal SAND PUMPS**



Shipment of 13 Denver Vertical Centrifugal Sand Pumps to a large concentrator, which now has 47 in its flowsheet.

HIGH EFFICIENCY—SELF PRIMING

The constant feed by gravity from the pump bowl to the pump runner results in pumping at maximum efficiency at all times. As long as there is pulp in the bowl, the runner pumps a full load. The pump is self priming due to this gravity flow principle. There is no suction head to cause air locks.

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The downward feed directly on top of the pump runner permits pumping coarse feeds and other difficult-to-handle material without clogging the pump. . . Ideal for pumping flotation concentrates. . . Feed sizes up to $\frac{1}{4}$ " are easily handled.

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The pump bowl acts as the feed box and no intake head is required . . . the feed flows by gravity into the pump bowl and down onto the runner.

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The Denver Vertical Centrifugal Sand Pump is made in $\frac{3}{4}$ ", 1", 1½", 2", 3", and 4" sizes, providing a wide range of capacities.

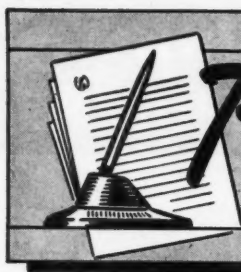
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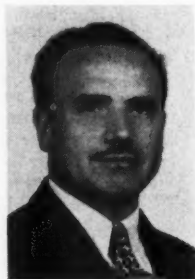


Personals

Clinton H. Crane, president and chairman of the board of directors of the Lead Industries Association since it was formed nearly 20 years ago, retired on May 21 at the annual meeting of the Association. Felix E. Wormser, vice-president of the St. Joseph Lead Co., who, from the founding of the Association until a year ago, was its secretary and treasurer, succeeded Mr. Crane as president of the Association. J. A. Martino, president of the National Lead Co., was elected vice-president and K. C. Brownell, executive vice-president of American Smelting & Refining Co., was reelected vice-president. Robert L. Ziegfeld continues as secretary and treasurer.

Arnold E. Reif, graduate student in chemistry at the Carnegie Institute of Technology, has been awarded the 1947 Students' Medal of the British Institute of Fuel for his paper, "Lump Density of Coal."

P. R. Paulick, consulting mining engineer, Library, Pa., has left for China, where he will be stationed for several months. He will be employed as a coal mining consultant with the Economic Cooperation Administration that is making a study



for railroad, mining, and industrial developments.

Henry R. Wardwell, formerly connected with the U. S. Vanadium Corp., is now a geologist with the Magma Copper Co., Superior, Ariz.

C. E. Hough has been appointed vice-president and general manager of Imperial Smokeless Coal Co., with headquarters at Quinwood, W. Va. In charge of operations, he is directing an extensive program of modernizing and rehabilitating the properties of this company, with a view toward increasing production. All mines are being completely mechanized.

Evan Just, editor of *Engineering and Mining Journal* (McGraw-Hill), New York, has been appointed director of the Strategic Materials Division of Economic Cooperation Administration. This division is being established to effectuate the provisions of the Foreign Assistance Act of 1948



calling for facilitating the production and procurement of materials needed by the United States. Mr. Just is a geologist and engineer, who has been editor of *Engineering and Mining Journal* for the past six years. He is on leave from that organization in order to assume his new duties. Previously he was secretary of the Tri-State Zinc and Lead Ore Producers Association, Picher, Okla., and before that a petroleum production engineer for the Carter Oil Company in Oklahoma. He has been engaged in geological work involving petroleum, lead and zinc, emeralds, fluor spar, and bauxite. He has taught geological, petroleum engineering, and mineral economics at Columbia University, Lehigh University, and the New Mexico School of Mines.

Charles J. Potter has been appointed president of the Rochester & Pittsburgh Coal Co., succeeding Heath S. Clark, who has been named chairman of the newly-created company finance committee.

Horace Moses, recently retired general manager of Kennecott Copper Co., Chino Mines Div., received an honorary degree of Doctor of Science at the New Mexico School of Mines at commencement exercises held May 28. Degrees were awarded to 20 graduating engineers. The graduation address was delivered by Dr. Merle A. Tuve, director of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, D. C.

W. C. Fancourt has been appointed chief engineer for the Pennsylvania Department of Mines, Mine Sealing Division. Formerly he was associated with the Berwind-White Coal Mining Co., and the Koppers Coal Division, Eastern Gas & Fuel Associates.

Philip W. Chase has been made manager of explorations for the Oliver Iron Mining Co., Duluth. In his new position he will direct exploratory work and investigations on a worldwide basis for raw materials for the iron and steel-making industry.

Don A. Hinckle, fuel service engineer for the New York Coal Sales Co., is in West Virginia at a stripping lease obtained from the Gauley Mountain Coal Co., checking coal specifications.

Dr. Frank F. Grout, professor of geology and mineralogy at the University of Minnesota, was retired on July 1, 1948. As a retirement gift, his students, colleagues, and friends presented him with a cash purse to defray his expenses to the International Geological Congress that convenes in London this summer.

Alexander Jack, formerly general manager of the Pennsylvania Coal & Coke Corp., has been appointed vice-president in charge of operations. Thomas L. Aitken, former general superintendent of the Ebensburg Coal Co., Colver, Pa., has been appointed general manager.

H. A. Gray, vice-president of the Eagle-Picher Mining & Smelting Co., in charge of traffic for the Eagle-Picher Co. and all subsidiaries, re-



H. A. Gray



A. L. Kreamelmeyer

signed to attend to personal interests in Indiana. A. L. Kreamelmeyer, general traffic manager of the company, will take over the position formerly held by Mr. Gray.

James H. Cunningham has been appointed assistant director of the Educational Department of the Bituminous Coal Institute. Along with other work, he will take over management of the Speakers' Bureau, relieving Dr. M. Edmund Speare, head of the Educational Department, of this time-consuming activity.

George Deike, president of Mine Safety Appliances Co., Pittsburgh, Pa., and his son, George Deike, Jr., chief engineer of the company, have been awarded the graduate degree of



George Deike, Jr.



George Deike, Sr.

Engineer of Mines by Pennsylvania State College for their theses on the coal industry. The subject of Mr. Deike's thesis is the History of the Fatality Record in Coal Mines in this Country from 1900 to 1906. His son received his degree for his History of Rock Dust Machinery in the Coal Mines in this Country from 1926 to 1948.

Dr. Charles E. Lawall, assistant vice-president and engineer of coal properties of the Chesapeake & Ohio Railway Co., was recently appointed permanent chairman of the Mining Development Committee of Bituminous Coal Research, Inc.

A. V. Taylor, Jr., president of the Taylor-Knapp Co., Phillipsburg, Mont., has been reelected president of the Mining Association of Montana for 1948. Gailen T. Vandel, first vice-president; R. B. Shelledy, second vice-president; Dr. Francis A. Thomson, chairman of the executive committee; and Robert P. Porter of the executive committee, were also reelected. Carl J. Trauerman is secretary of the organization.

Andrew B. Crichton, president, Johnstown Coal & Coke Co., was the featured speaker at the 85th annual banquet of the Baltimore-Maryland Coal Exchange, Inc., held recently in Baltimore. E. N. Gorman, president, Cumberland Coal Co., is president of the Exchange.

Robert E. Shinkoskey will be the new superintendent of the American Smelting & Refining Co. plant at Selby, Calif.

D. C. Helms has been promoted to the position of general manager of the Lehigh Navigation Coal Co. of Lansford, Pa. W. J. Parton is assistant general manager and R. E. Hobart, who has resigned from his duties as mechanical superintendent, will continue with the company as a consultant. W. E. Connor will be mechanical superintendent for the company.

Charles J. Hannigan has been named general superintendent of Sterling Coal Co., Bakerton, Pa., succeeding the late William Lamont.

Harry B. Baylor, vice-president of International Minerals & Chemical Corp. in charge of the plant food division, retired on July 1 after 35 years with the company. Maurice H. Lockwood will take over the work formerly handled by Mr. Baylor.

James M. Cook has retired as vice-president in charge of operations after a total of more than 30 years of service with the Imperial Coal Corp. at Johnstown, Pa.

An irreparable loss to the mining industry of the Northwest and the country in general has been suffered in the passing of Leo J. Hoban, 58, secretary-treasurer of the Hecla Mining Co. Mr. Hoban died suddenly on June 16, 1948, in Wallace, Idaho.



Mr. Hoban had been secretary of the Hecla Mining Co. since about 1940, and had been assistant secretary for some time before that. He was an expert accountant, and well versed in the tax problems of the mining industry. An active member of the Tax Committee of the American Mining Congress, Mr. Hoban had for years rendered great service to the industry in its efforts to obtain adequate recognition of its special problems under the Federal revenue laws.

Albert Roberts, of the Mineral Separation North American Corp., died after a heart attack on Sunday, May 16. After graduation from the Columbia School of Mines, Mr. Roberts engaged in mine examination and operation in the western part of the United States and Canada for various companies. In 1911 he joined the U. S. Smelting, Refining & Exploration Co. and later was with the U. S. Smelting Refining & Mining Co., with whom he remained until 1917, when he became field engineer for Mineral Separation North American Corp., owners of basic patents for flotation processes of concentrating ores. For the past 30 years he has been active in that organization in the development and acquisition of new metallurgical processes and the development of allied projects. Since 1935 he has been a member of the board of the United Engineering Trustees, Inc., holding various capacities in that organization.

Roland I. Erickson, formerly with Compania Minera Unificada del Cerro Rico de Potosi, Potosi, Bolivia, has joined the engineering staff of the Cleveland-Cliffs Iron Co., and will be located on the western Mesabi range.

John H. Redmond, former vice-president and general manager of Precisioneering, Inc., has been appointed assistant production manager of Koppers Co., Inc.

Dr. Chester R. Swackhamer, chief surgeon of the Magma Copper Co., Superior, Ariz., retired on June 1 after 28 years of service with the mining company. He has been succeeded by Dr. G. P. Schnabel.

— Obituaries —

Arthur Albert Dreyer, 37, mining engineer, passed away May 20, after a brief illness. At the time of his death he was mine foreman for Pend Oreille Mines & Metals Co., Metaline Falls, Wash. Since his graduation from Washington State College in 1933, he had worked for Standard Silver Lead Mining Co., in Montana and New Mexico; for Mt. Washington Mining Co., near Helena, Mont.; and for the Reconstruction Finance Corp.

Moroni Heiner, 71, president of the Utah Fuel Co., passed away June 25 in a Salt Lake City hospital after a brief illness. Mr. Heiner, a native of Utah, attended Utah schools and was graduated from Brigham Young College in Logan, Utah, in 1899.

After a period of several years of service as a teacher, and then as State Dairy and Food Commissioner, he became vice-president of the Castle Valley Coal Co. in 1909. From 1914-1932 he was vice-president of the Utah Fuel Co. He became president in 1932.

One of the prominent coal men of the country, Mr. Heiner was continuously active in serving the best interests of the coal industry.

Clarence Peck Daniel, president of the Enterprise Wheel & Car Corp., died April 17. Mr. Daniel was widely known throughout mining circles, and had taken an active part in the work of the Manufacturers Division of the American Mining Congress. His passing was a distinct shock to his many friends and associates who will long remember his kindly courtesy and keen sense of humor.



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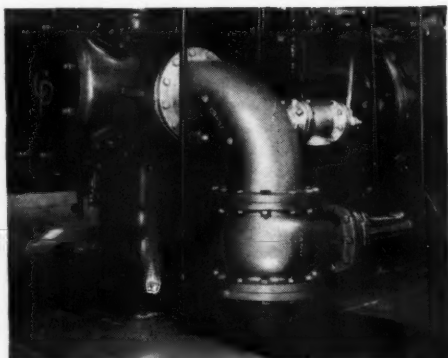
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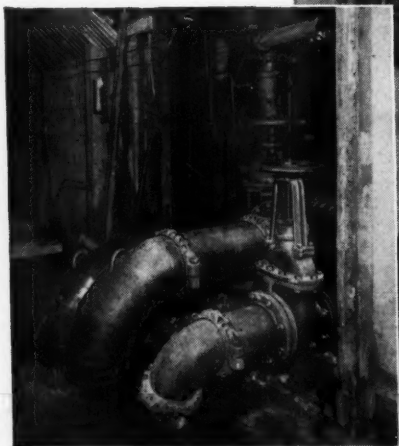
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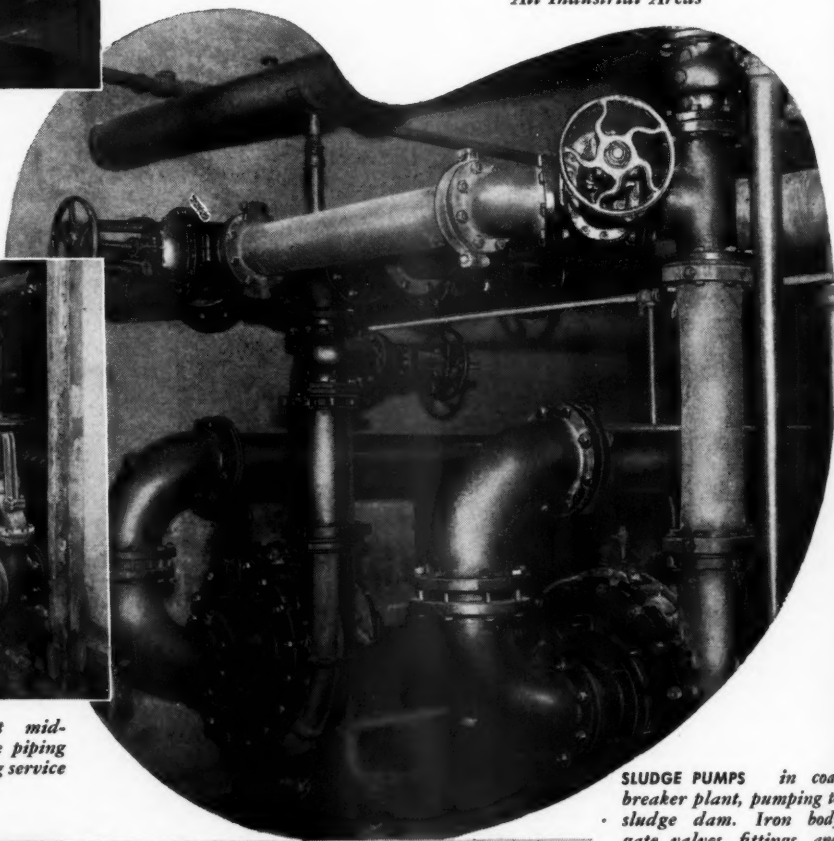
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COMPRESSOR IN COPPER MINE power house equipped by Crane, showing Crane iron double-disc gate valve, safety valve, and flanged fittings.



DRAINAGE WATER STORAGE at mid-level in deep pit where Crane piping materials are giving outstanding service under severe conditions.



SLUDGE PUMPS in coal breaker plant, pumping to sludge dam. Iron body gate valves, fittings, and pipe from the complete Crane line.

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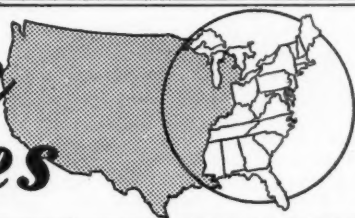
FOR EVERY PIPING SYSTEM

NEWS

and VIEWS



Eastern States



Pittsburgh Consolidation Expands Ohio Operations

Pittsburgh Consolidation Coal Co. has expanded strip-mining operations in eastern Ohio through acquisition of additional coal properties and operations near its Georgetown mine at Adena, Ohio.

The company has acquired the Porter Coal Co., Consolidated Fuel Co., and the Kenvale Coal Co., coal land holding companies. It has also acquired the Kenvale Mining Co. and Cadiz Mining Co., which are strip operators. It is reported that the acquisition of these companies involved \$1,235,000. Output from these strip mines will help the company to meet the greater demands for coal in the upper Great Lakes region.

Commercial Use Developed for Breaker Slate

Twenty years of research has enabled the Lehigh Material Co., a subsidiary of the Lehigh Navigation Coal Co., Inc., to begin production of a quality lightweight aggregate at its new plant near Tamaqua, Pa. This new aggregate, the base of which is slate coal, is known as Lelite. High insulation and sound absorption qualities plus lightness of weight are claimed for the new aggregate. The aggregate is produced from breaker slate by bloating through a sintering

process in furnaces of a special design. Small-sized anthracite for ignition promotes the bloating process. Passing through an ignition chamber, the slate reaches the stage of incipient fusion which converts to an inert and structurally strong form. The sinter cake is broken into large lumps and then crushed to minus 2½-in. size. A grading plant further crushes and screens the product to produce specification sizes.

Morrow BCR President

J. B. Morrow, first vice-president of Pittsburgh Consolidation Coal Co., was elected president of Bituminous



J. B. Morrow

Coal Research, succeeding Howard N. Eavenson, who resigned after many years of continuous service. Robert H. Sherwood, president of Central Indiana Coal Co., Indianapolis, Ind., was elected as first vice-president. Directors also elected R. D. Stockdale, president of the Red Jacket Coal Sales Co., to a vice-presidency, and Dr. Harold J. Rose was reelected as vice-president and director of research.

Mobil-Mill Treats Fluorspar Ore

A new heavy density Mobil-Mill has been installed at the Keystone fluorspar mine of the Inland Steel Co., near Marion, Ky. Producing an excellent grade of spar, the mill handles up to 120 tons of crude ore per hour.

Koppers and Gulf Oil Join in Synthetic Research

An agreement was recently signed between the Koppers Co., Inc., and the Gulf Oil Corp. for cooperative research and development of processes for the conversion of coal to gas and liquid fuels. Both organizations have been working independently for production of synthetic fuels up to this time. The cooperative program now joined may lead to the establishment of new facilities for the development of synthetic fuels.

Fischer-Tropsch Contract Let

A Fischer-Tropsch pilot plant will be built in Bruceton, Pa., for the Bureau of Mines by the Chemical Plants Division of Blaw-Knox Co. The pilot plant is part of the Bureau's extensive program for the development of information and processes on the production of synthetic liquid fuels from coal. The pilot plant will eventually be used to process up to 7500 cu ft of synthesis gas per hour, from which will be produced up to 5 bbl per day of crude output.

Trace Mountain Project Progresses

Near Holden, W. Va., heavy equipment is working at the task of opening a new mine. Railroad grades, roads, a mine entrance, an air shaft, and a railroad tunnel are all under preparation of the preliminary steps that are being made to mine coal by the Island Creek Coal Co.

Car Shortage Curtails Some Coal Mine Operations

According to a May report from Appalachian Coals, Inc., the coal mines in District 8 were operating at only 75 per cent of full potential because of a serious freight-car shortage caused by inability of the railroads to get delivery on new cars and the tremendous development of strip mine and truck-rail production. Another factor adding to the shortage is the practice of many coal-consuming plants of shutting down on Saturdays and holding over loads of coal until the following week thus interfering with the regular normal circulation of freight cars.

Mine Inspectors' Convention

The 38th annual convention of the Mine Inspectors' Institute of America was held at Columbus, Ohio, on June 7, 8, and 9, with headquarters at the Neil House. At the first business meeting on Monday afternoon, recent mine explosions were discussed in detail, with an analysis of their causes and means of prevention. John H. Hansford, director of mine rescue and safety, Department of Mines, Charleston, W. Va., delivered a paper on "Causes and Prevention of Mine Fires on Conveyor Belts." On Wednesday morning methods of roof support by means of suspension rods and other systems were outlined by Edward M. Thomas, mining engineer, Coal Mine Inspection Branch, U. S. Bureau of Mines, College Park, Md., and the subject was discussed by C. C. Conway, chief engineer, the Consolidated Coal Co., St. Louis, Mo. Mr. Conway's paper on this subject appeared in full in the June issue of MINING CONGRESS JOURNAL.

Important changes in state mining laws were considered by experts from the states of Pennsylvania, Kentucky, and Illinois.

Papers on coal mine haulage accidents and their prevention were delivered by A. J. Bartlett, director of safety, Island Creek Coal Co., Holden, W. Va., and Andrew Hyslop, chief engineer, Hanna Coal Co., St. Clairsville, Ohio, on Wednesday afternoon. Safe practices in strip mining operations in both bituminous and anthracite coal were outlined by W. J. Schus-

ter, safety director, Hanna Coal Co., and David W. Cosslett, mine inspector, 9th Anthracite District, Department of Mines, Wanamie, Pa. Lester Briscoe, electrical engineer, Ayrshire Collieries Corp., Indianapolis, Ind., discussed the safe practices which should be followed in bituminous strip mining.

E. W. Felegy, mining engineer, Health and Safety Branch, U. S. Bureau of Mines, Salt Lake City, presented an article on the progress that has been made in a practical method of voice communication through soil and strata. The final paper on the program was "A Practical Method of Rock Dusting in Multiple Shift Conveyor Operations," by B. H. Mills, inspector, U. S. Coal and Coke Co., Lynch, Ky.

Association Elects Officers

At the annual organization meeting of the board of directors of the Georges Creek and Upper Potomac Coal Association, Andrew B. Crichton of Johnstown, Pa., was elected president; Dr. George D. Campbell, Piedmont, W. Va., vice-president; and H. R. Freeman, Cumberland, Md., sec-

retary and treasurer. These officers were elected for the year 1948 and until their successors are elected.

U. S. Bureau of Mines Staff Changes

Charles W. Merrill has been designated acting assistant chief of the Economics and Statistics Division and will continue to serve as chief of the Metal Economics Branch of the Bureau of Mines. J. S. McGrath has been transferred to the office of the chief of the Economics and Statistics Division for special assignments and will continue to serve as liaison officer with the Department of State on administrative matters pertaining to all foreign activities of the Bureau. Elmer W. Pehrson has been designated acting chief of the Foreign Minerals Branch but will continue to serve as chief of the Economics and Statistics Division. C. E. Nighman was transferred to the Foreign Minerals Branch where he will serve as acting chief of the Branch and European specialist. Richard H. Mote will have immediate charge of the non-ferrous metals work and N. B. Melcher will be in charge of the ferrous work of the Metals Economics Branch.

Foote Mineral Co. Expands Facilities

From original recognition as a major supplier of mineral specimens to universities, museums, and private collectors, the Foote Mineral Co. has grown to be one of the nation's outstanding facilities for processing ores and minerals from all over the world. Specializing in the production of the less-common products, Foote facilities produced the first Cesium and Yttrium salts available to industry in the

United States. In 1939 they produced the first American pure ductile zirconium metal. During the war a lithium plant was operated which was expanded for handling rutile, ilmenite, chromite, and manganese ores. Recently the plant has again been expanded to provide a new mill building, a new large warehouse, and many other production and operational improvements.



Enlarged plant includes new mill building, warehouse, and other production and operation improvements

L. E. YOUNG
Consulting Engineer
Mine Mechanization
Mine Management

Oliver Building Pittsburgh, Pa.

Mineral Producers Meet

On June 11, Mineral Producers Association held its annual meeting at William Penn Hotel, Pittsburgh, Pa. Following a directors' meeting and a luncheon and business meeting, a general meeting was held in the afternoon. Vernon L. Wheeler, district representative of The Euclid Road Machinery Co., Cleveland, presented a paper on "Modern Methods of Moving Dirt." M. A. Crawford, general counsel, Mineral Producers Association, spoke on the "Home Rule Tax Muddle." A paper entitled "Spoil Bank Utility" was presented by Dr. A. G. Chapman, chief, division of Forest Management Research, Central States Forest Experiment Station, Columbus, Ohio, and Thomas F. Downing, fuel agent, Philadelphia Electric Co., Philadelphia, spoke on "The Kind of Coal We Want."

A symposium, with R. T. Laing as moderator, was conducted to clarify a variety of problems which affect coal producers. At the annual dinner, Charles O'Neill, president, The Central Pennsylvania Coal Producers' Association, was the leading speaker.

French Group Studies U. S. Methods

Members of a French mission are now in the United States to study hand-loading operations in various mines throughout the country. In addition, they are interested in modern mechanical-loading machinery for use in French mining enterprises.

It has been reported that the trip is being made under the auspices of the Chambre Syndicale des Mines de Fer de France, which comprises all French iron-mining enterprises. All orders for equipment are placed through the syndicate, which arranges for issuing necessary import licenses, procurement of dollars for financing, and other details. Correspondence may be addressed to the mission, care of Joy Manufacturing Co., Empire State Building, 350 Fifth Avenue, New York 1, N. Y.

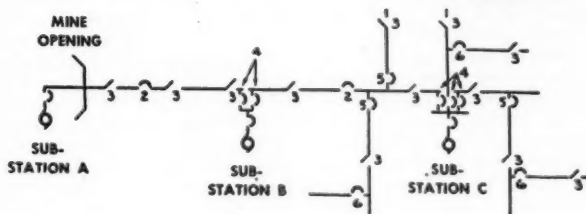
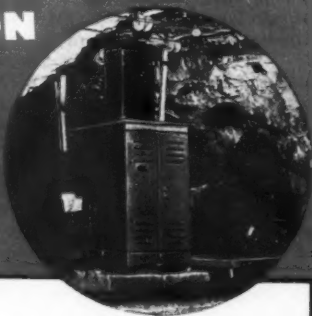
Permissible Mine Equipment

A list of electrically-operated mine equipment tested during 1947 and approved as safe for use in gassy coal mines is now available from the Bureau of Mines. Many new types of machines and devices for reducing explosion and other dangers incidental to coal mining are included in the report. Copies of Information Circular 7465, "Permissible Mine Equipment Approved During the Calendar Year 1947," may be obtained free from the Bureau of Mines, Publications Section, 4800 Forbes Street, Pittsburgh 13, Pa.

JULY, 1948

Another ITE PRODUCTION-BOOSTING SECTIONALIZATION PLAN

Sample layout No. 4 in a series illustrating recommended sectionalizing practices



Key

- 1-T-E Type KSC Circuit Breaker—installed in circuit between each two substations.
3. A disconnect switch or protective device placed at not over 1500 foot intervals in every power line.
4. I-T-E Type KSA Circuit Breaker (trip-free operating mechanism)—used as overcurrent protective device in each circuit leaving a substation.
5. I-T-E Type KSC Circuit Breaker—

Key

- installed as overcurrent protective device at each main branch circuit.
 6. I-T-E Type KSC Circuit Breaker—to protect secondary branch circuits (i. e. a circuit feeding only one local section or territory).
- Note: In every case, sufficient feeder and return circuit capacity should be provided so that circuit breaker will be opened by a dead short at the most remote point of the circuit.

When electrical distribution systems are sectionalized with I-T-E Sectionalizing Switchgear, production levels are raised: time lost because of electrical disturbance is kept to a minimum, and safety to personnel and equipment is assured.

In the above application, the heart of protection is the I-T-E Type KSC Automatic Reclosing Circuit Breaker. The only circuit breaker designed especially for the mining industry, the KSC has ample flexibility for meeting changing mine conditions. Completely dependable, it is durable and efficient under the most severe operating demands. Rugged and compact for easy portability, it is also completely metal-enclosed for safety—yet readily accessible for inspections and maintenance.

The I-T-E representative in your locality can give you complete information on the I-T-E Type KSC Automatic Reclosing Circuit Breaker. He is also fully qualified to assist you in the adoption of recommended sectionalizing practices in your mine. Use his services with no obligation.

Be Production-Wise ... Sectionalize



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Coal Gasification Experiment

Another coal gasification experiment is under preparation now by the Alabama Power Co. and the U. S. Bureau of Mines. The new test will be done on a much larger scale than the previous experiment. Much new equipment has been unloaded at Gorgas, Ala., near the site of the first gasification experiment. The Alabama Power Co. and the Bureau of Mines are cooperating by supplying technicians and the Alabama Power Co. has supplied the site of 200 acres of coal land with the Bureau of Mines supplying the remainder of the necessities. In addition to gasification, a roof study will also be conducted on the strength of information obtained from the first gasification experiment. The first experiment showed that the rock expanded two to three times and, although porous, was stronger than the original rock. The expanded rock filled the cavity left where the coal was gasified and served as pack walls to support the roof.

Both England and Canada have appropriated money for gasification experiments. English engineers have been granted permission to observe the new Alabama experiment.

Elevation Meter Exhibited

Sperry-Sun Well Surveying Co., Inc., exhibited their new elevation-meter trailer at the Statler Hotel in Washington, D. C., on June 22. It consists of a trailer which can be towed behind an ordinary passenger vehicle or almost any type of trac-

tor. On the trailer is mounted a pendulum which works in conjunction with an electronic integrator and computes elevations with great accuracy while the vehicle is traveling at the rate of 20 mph. A test run will be made for the USGS in the near future.

Britain Loses Top Position in Mining

In his annual statement to stockholders of Selection Trust, Ltd., A. Chester Beatty, chairman, one of the deans of the British mining industry, stated that London no longer holds its former position as the mining center of the world. Among the contributing factors to the passing of London as the seat of major activities he mentioned the high rate of income tax and profit tax and the fact that no allowance against taxation for depletion of the deposits is allowed. He cited the unjust duty on so-called "bonuses" as hampering the raising of new capital, as does likewise the fear of other new and arbitrary forms of taxation. Mr. Beatty stated that rigid controls on capital issues, foreign exchange, purchases of materials, and restriction on practically every aspect of business have contributed to the decline of the rate of incorporation of new mining companies in London.

Discussing the holdings of Selection Trust, Ltd., Mr. Beatty stated that the cost of production on the Rhodesian copper belt constantly increases but that no major reduction in the world demand for copper may be expected despite price fluctuation in the copper market.

New Mine Under Construction

Near its Wolf Run Mine, near East Springfield, Ohio, the Warner Collieries Co., is constructing a new mine. Every effort is being made to assure smooth operation with a minimum of hazards by equipping the mine with the most up-to-date electrical and mechanical equipment and safety devices. The modern five-track tippie will have a capacity of 350 tons of coal an hour. The coal will reach the tippie and mechanical cleaning plant from a 42-in. belt conveyor which extends 1700 ft down the mine slope. Also provided for in the slope are a runway for rubber-tired supply trailers and an emergency stairway.

European Metal Needs

Simon D. Strauss, manager of sales of the American Smelting and Refining Co., recently returned from a three-week business trip to England, Switzerland, Italy, Holland, and Belgium. In his opinion the amount of metal purchased by the European countries that come under the Marshall Plan is not likely to be larger in 1948 than it was in 1947. Mr. Strauss reported that practically every foreign country needs copper, lead, zinc, and other metals. The stringent financial situation abroad, despite ERP aid, together with the inability of countries purchasing fabricated products to pay for them in Swiss and Belgian francs have slowed down metal purchases by those two countries.

BRAND NEW VENTILATING FANS FOR MINE USE



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Ventilating Fans, Axial Flow, size (code) A3DIW5, 3000 CFM. Waterproof, Counter-clockwise, overall dimensions, 37" high, 24" diameter. Equipped with Westinghouse stab. shunt wound 3/1.25 HP Motor, 115 Volts D. C., type SK. Frame 43.3F, 25.4/13.9 amps, 1750 1310 RPM. With controllers and rheostats. Fan Mfr.: B. F. Sturtevant Co. Westinghouse Magnetic Controller Box: Size 1 D. C. Motor Starter, Class 6311-S11 with Current-Limit Acceleration, Navy Spec. 17-C-17 Service A, Low-Voltage Protection Control Circuit with Local start and stop push buttons. Class-6311S11, Style-1367706, Volts-115, HP-3.

Westinghouse Rheostat: Type-WL Rheostat, Style No. 1312858, Ohms-80, Amps-2.3-1.3, Volts-250.

Price—\$100.00 each

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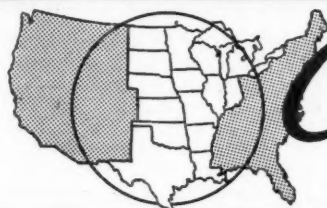
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Promotions at Consolidation Coal Co. (Ky.)

H. C. "Whitey" Hall has been promoted to assistant mine foreman at Mine 207 due to a vacancy created by transfer of R. J. Collins to the Winters Mine. Walter Malick has been made section foreman at the Wright Mine. William O. Coy, employed in January 1948 as mechanic at the Strip Mine, has been promoted to foreman. Bert Blanton, whose record dates back to 1931, has been promoted from dispatcher at Mine 207 to haulage foreman at the same mine. George Wilson, dispatcher at Clover Splint Mine, succeeds C. A. Card, who resigned his position as mine foreman. Victor DeSimone, who joined the company upon finishing school in 1941, has been made section foreman at Hill Mine.

Carl Dann, who for a number of years has been assistant safety inspector, has been transferred to Mine 155 at Van Lear as superintendent, replacing M. M. McCormick who resigned.



Central States

Largest Excavator On Mesabi Range Goes to Work

A 25-yd bucket capacity, 1150 B dragline is now in operation at Butler Bros.' South Agnew mine near Hibbing, Minn. It is the eleventh machine of this size to have been constructed. The others are employed in coal and phosphate mining.

With its 180-ft-long boom, the dragline can dig 110 ft below the ground level. Within a short time the dragline will be employed in loading into the portable screening plant which will feed the dirt on to a conveyor belt. Estimated digging capacities of the unit when loading into the screening plant is about 1010 cu yd per hour.

Riddell Mucker on the Gogebic Range

A Riddell clam-shell mucker is in use at the shaft of Jones & Laughlin's Vicar mine near the east end of the Gogebic Range, at Wakefield, Mich.

Safety Trophies Awarded

"Sentinels of Safety" trophies signifying outstanding safety achievements in 1947 were awarded to leaders in six classes of mineral operations attaining the best accident records in the 23rd annual National Safety Competition held under the auspices of the Bureau of Mines. Certificates of achievement in safety were awarded to 96 mines and quarries who were above-average in safety performance during 1947. Both the certificates and the awards were based on accident records in anthracite and bituminous coal mines, metal and nonmetallic mines, open-pit mines, and quarries. Perfect safety records throughout the year were reported by 107 of the 476 mines and quarries enrolled in the competition for the 1947 trophies. They total 10,551,366 man-hours without a disabling injury. The Sentinels of Safety trophies, donated by *The Explosives Engineer*, are held by winning companies for one year and each employee of the winning companies receives a Certificate of Achievement in Safety from the Bureau of Mines.

The six trophy winners in the various classifications are as follows: The

Dolomah dolomite quarry of the Tennessee Coal, Iron & R. R. Co.; the Mahoney iron-ore mine of the Picklands Mather & Co.; the Soudan iron-ore mine of the Oliver Iron Mining Co.; the No. 5 Limestone mine of the Tennessee Coal, Iron & R. R. Co.; the Winton Nos. 1 and 7½ mine of the Union Pacific Coal Co.; and the Butler mine of the Jermyn-Green Coal Co.

Taconite Sinter Production

Late this summer blast furnaces of the Youngstown Sheet & Tube Co. may begin smelting iron from the first beneficiated iron ore produced commercially from taconite. The first sinter production of the Erie Mining Co.'s new \$1,250,000 pilot plant at Aurora, Minn., was produced early in July.

Usually high blast-furnace yields are expected from the sintered ore which contains about 65 per cent iron. The sinter is delivered in the form of balls approximately ½ in. in diameter. The high iron content of the sinter should enable it to compete on good terms with Lake Superior ores as the higher blast-furnace yields should offset higher production costs and freight charges.

Federal Lignite Laboratory to Be Located in North Dakota

Important studies in the mining, preparation, and use of lignite will be conducted at the Bureau of Mines new lignite research laboratory which will be established on the campus of the University of North Dakota at Grand Forks, N. Dak. Thirteen acres on the campus have been donated by the university to the Government for the location of the \$750,000 lignite laboratory.

Located in the nation's richest lignite region, studies will be beneficial to all lignite states. Domestic lignite reserves are estimated at 939,000,000,000 tons and the bulk of it is said to be in North Dakota, South Dakota, and Montana. North Dakota currently produces about 96 per cent of the total annual production of 2,668,000 tons of lignite.

James Boyd, director, U. S. Bureau of Mines, said that the lignite research laboratory has long been

needed in the interest of conservation and national security. Studies on lignite will prepare the way for the use of lignite in place of high grade coke and coal wherever such substitution is feasible. Experiments may lead to the practical use of high-hydrogen gas from lignite for reducing low grade Minnesota iron ores.

Calumet and Hecla Continue Exploration

Although recently Calumet & Hecla suspended diamond drilling operations in the Calumet-Keweenaw district, explorations in the district and elsewhere by the company are being continued. Churn drilling in the Wisconsin zinc and lead district indicates that Calumet & Hecla may have one or more important ore bodies and drilling operations there are continuing. Float and sink tests are planned for testing copper ore from the Calumet & Hecla properties near Rockland, Mich. If the tests show that a concentrate can be made without too much loss in tailings, the ore may be shipped to the Lake Linden mills.

Considerable areas in the copper country remain to be explored and resumption of diamond drilling in the Wolverine and Allouez zones is looked for in the future.

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ON work where materials are to be moved distances of several hundred feet or more from pits, ponds, banks or stockpiles, a SAUERMAN Power Scraper or Cableway is a great money-saver because it will dig, haul and place the materials in one operation.

Sizes range from small portable units designed for cheap handling of a small hourly tonnage of loose materials up to powerful machines that will take 15 cu. yds. at a bite and move this big load a distance of 300 ft. in about one minute.

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Mining Company Establishes Scholarship

The Montreal Mining Co. of Montreal, Wis., has established a four-year scholarship in mining engineering at the Michigan College of Mining and Technology.

Applicants for the scholarship are limited to residents of Gogebic County, Mich., or Iron County, Wis., who are sons of employes of the Montreal Mining Co. or the sons of former employes who have died, retired, or become totally disabled while in the employment of the company.

The scholarship pays an annual stipend of \$500 if the winner is a resident of Michigan, or \$575 if the winner is a resident of Wisconsin.

Ohio Team Wins Safety Honors

For the third time in the past four years, Goodyear Tire & Rubber Co.'s first-aid team from Wheeling Township Coal Co., Adena, Ohio, won first place honors in the All-Ohio Safety Congress meet at Columbus. The Goodyear team finished with a score of 99.35 or a total of 1987 points out of a possible 2000. This third victory gives the team two legs on the coveted trophy offered by the Bureau of Mines,

however a win in 1949 is necessary for permanent possession of the cup.

In connection with the Congress a luncheon was held at which Jack Kidney, safety director for Goodyear, spoke on "Labor and Management Cooperation in Safety."

Richard Morris, vice-chairman of the division of safety and hygiene, representing the Industrial Commission of Ohio, presented the cup and an attractive plaque. Members of the Goodyear team are Louis Jeslosky, captain, John Hayest, Rennie Bradley, Kenneth Greer, George Wjer, and Joe Ordiss.

Lake Iron Ore Shipments Up

Iron-ore shipments in lower Lake ports were approximately 30 per cent ahead of 1947 shipments for the period April-May 1948. The shipping season during 1948 began earlier than it did in 1947. During May nearly a 12-per-cent increase from a year ago was made, but the total increase for the two-month period over 1947 shipments was 30 per cent according to the Lake Superior Iron Ore Association. Shipments so far this season totaled 19,286,548 tons as compared to 14,821,264 tons for the same period a year ago.

New Level Opened in Salt Mine

Myles Salt Co., Weeks Island, La., is planning to mine a second level in the salt dome which will leave a 120-ft pillar between it and the first level. An incline is to be driven from the 550 level to the second level and a conveyor belt will elevate the salt from the second level to the first.

New Film Announced

The Wolverine Tube Division of the Calumet and Hecla Consolidated Copper Co., Inc., recently announced completion of a new, 16 mm movie—"Quality Control—From Ore to Finished Product."

The film follows copper ore from deep in the Calumet and Hecla mines in Upper Michigan, through its fabrication as seamless, non-ferrous tubing and on to typical end applications.

The 40-minute movie is in full color and complete with sound track. It is designed for professional, engineering, and business groups.

Showings can be arranged by contacting Wolverine Tube Division, Advertising Department, 1411 Central Avenue, Detroit 9, Mich.



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The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

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**PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS**

Hawkins Open Pit Has New Conveyor Belt

Hawkins open-pit iron mine at Nashwauk, Minn., on the Mesabi range, began operation of their new pit-conveyor system on May 10. All production from within the pit is delivered by the belt from a point within the pit direct to rail loading pocket on the surface. This new system replaces the railroad haulage which had been in operation for many years. The two stage belt has an over-all inclined length of 1085 ft with a total vertical lift of 255 ft. The rated speed of the belt travel is 550 fpm and it delivers ore at the rate of 700 tons per hour.

Manpower Shortage Curtails Homestake Operations

Difficulty in obtaining manpower for underground operations makes it unlikely that Homestake will achieve anywhere near capacity operations this year. The company's mines at Lead, S. D., have been operating at 60 percent capacity for the last two years. This, plus a 50 percent increase in the cost of labor since before the war, indicates 1948 earnings equal or possibly a little lower than in 1947 when net before depletion was \$4.65 a share and after depletion was \$2.86 a share.

1947 Safety Record

Industry closed its books on 1947 with a better safety record than the year before, according to the National Safety Council. The 1947 industrial injury rates show that the over-all accident picture is improving.

The accident frequency rate for all industries submitting company reports to the council, based on the number of disabling injuries per 1,000,000 man-hours, was 13.26 in 1947, a reduction of 10 per cent from the year before.

The communications industry again had the lowest frequency rate, leading all other industries last year with a rate of 2.98, a 10 per cent reduction from 1946. The second place industry was electrical equipment, with a frequency rate of 6.02, down 21 per cent from 1946, when it placed sixth.

At the other end of the list, coal mining climbed up one step from the bottom position as the result of 7 per cent reduction. Its 1947 rate of 54.46 was better than the lumbering industry, which had the highest 1947 frequency rate of 59.74. Lumbering was second highest in 1946.

The accident severity rate for all industries reporting to the council, based on the number of days lost per 1000 man-hours, was 1.23 in 1947, a

reduction of 7 per cent from the year before.

Communications again led all other industries with the lowest severity rate. Its 1947 rate was .16, a reduction of 24 per cent from the previous year. Wholesale and retail trade ranked second last year with a rate of .17, moving up from its fifth place standing in 1946.

Coal mining stayed at the bottom of the list again, with the highest accident severity rate of 7.96, but that was a 27 per cent reduction from the rate in 1946. Mining, other than coal, had the second highest rate both years, 6.58 in 1946 and 6.17 last year.

Louisiana Salt Aids Gasoline Production

The Ethyl Corp., Baton Rouge, La., the largest producer of salt cake in the south, now makes salt cake from Louisiana mines combined with sulphuric acid made from Louisiana sulphur. Salt cake is also used by the kraft paper mills. The bi-product, hydrochloric acid combined with ethylene made by the Ethyl Corp. is used to produce antiknock compound in gasoline.

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York Mine Washing Plant

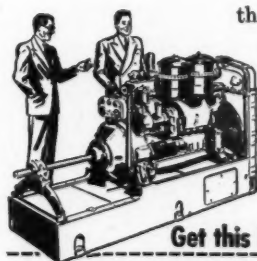
A new washing plant at the old York mine of the Pacific Isle Mining Co., Hibbing, Minn., was recently completed. The company is active in four areas on the Mesabi iron range and expects to produce about 150,000 tons of iron ore in 1948.

New Iron Mine at Florence

In Florence County, Wis., the Inland Steel Co., through its subsidiary, the Jackson County Iron Co., has leased an iron ore property on which exploratory drilling has been active. The necessary surface excavation development work is now under way.

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The forked base slips securely onto pins set in the rib. It can't slip out, yet there is no interference with loading machines. Head of Jack sets securely against supporting timber.

These Jacks save productive time because they are quickly set into place and are easily adjustable to varying roof heights. Simplex engineering has given them a foolproof mechanism plus rugged construction. With them, you avoid needless dangers of ordinary supports.

Available in 8 and 16 ton capacities — complete with square tubing (1½" or 2½" diam.), or with fittings alone for use with 2" standard or extra heavy round pipe.

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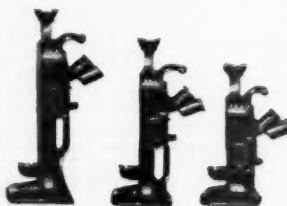
Two Types of Handles



Inset above shows Simplex Model PB with new Type "FL" Head for use with Pin-Up Jacks — 4¾" or 6¾" wide.

SIMPLEX **Ratchet Lowering** **MINE JACKS**

Use these Safety Speed Ratchet Lowering Jacks — 5 to 35 tons cap. — for all purpose jacking with cutting and loading machines, rerailing mine cars, shop and track work. All models lift full capacity on cap or toe — an exclusive Simplex feature.



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Inland Steel Co. Staff Changes

Richard O. Marsten has been appointed assistant superintendent of the Sherwood iron mine, Iron River, Mich. R. W. Edwards has been appointed to the post of assistant superintendent of the Greenwood iron mine, near Ishpeming, Mich. W. P. Reed is assistant superintendent of the Bristol iron mine, Crystal Falls, Mich. F. A. Olson, former mine superintendent with the company, has been appointed to a new post as superintendent of lands at Inland Steel's offices at Ishpeming, Mich.

Copper Range Reserves

Low grade copper reserves of the White Pine orebody of the Copper Range Co. reported in the June issue of MINING CONGRESS JOURNAL in several instances had "per cent" attached to the figures instead of "pounds."

Actually preliminary estimates indicate 94.2 million tons of developed ore averaging 21.4 lb of copper per ton, including 44.7 million tons of parting shale averaging 26.0 lb of copper per ton. An estimated 105.4 million tons of probable ore averages 23.0 lb of copper per ton, of which 62.0 million tons of parting shale averages 25.1 lb of copper.

Tri-State Producers Association President Calls for Unrestricted Metal Market

In a recent statement, O. W. Bilharz, president of the Tri-State Zinc and Lead Ore Producers' Association, stated that three alternatives are left to aid lead-zinc producers of the Tri-State field. "Operators can fight it out by liquidating their remaining resources as economically and as quickly as possible and quit; they can contract at a fixed price with the stockpiling authorities; or, they can tighten their belts still further and hope that a reasonable price increase will be forthcoming in time to keep them in business."

Mr. Bilharz expressed the feeling that "When the full impact of the national military establishment's expansion plan is felt, there will be a need for every pound of metal in our present uneconomic marginal mine and every pound will command a price to permit economic extraction."

In closing Mr. Bilharz stated "The demand is there, the supply is available. It will take a price to bring it out. We must have unrestricted markets in metals to allow prices to seek the balance the law of supply and demand dictates, and only then will production in our metal mines again catch up with consumption."



Western States

Idaho Mining Association Meeting

ON MAY 31 and June 1-2, the Idaho Mining Association held a memorable meeting at Sun Valley, Idaho. Although some of the speakers scheduled to appear on the program were unable to attend, papers presented were of the highest calibre and of the greatest importance to the mining industry. All officials were reelected including J. B. Haffner, president; A. H. Shoemaker, vice-president; and Harry W. Marsh, secretary.

The declaration of policy adopted at this 19th annual meeting of the association was based on the premise that "Only the productive can be strong and only the strong can be free." Of general interest to the mining industry was the policy adopted on currency. The association urged the repeal of the prohibition on the free circulation of gold and restoration to the citizens of the right to own and export gold. A currency with a metallic base, using both gold and silver, was advocated. The continued purchase of domestic gold and silver with the miners given the op-

tion of receiving dollars at the prevailing rate or his own gold authenticated by the Treasury as to weight and fineness was endorsed. The association advocated that gold mine owners and operators should be reimbursed for capital losses and maintenance costs, including taxes, interest paid on obligations, with such capital losses, maintenance costs, resulting directly or indirectly from compliance with limitation order L-208 of the War Production Board.

On stockpiles and premiums, the association endorsed the following statement made by the advisory council: "It is the consensus of the committee: (1) that in times of peace incentive production payments for metals in excess of market prices are not economically justified; (2) under emergency conditions, if defense authorities now require additional metals and minerals for stockpiles, production incentives, including but not limited to maintenance of manpower, tax reform, payments of premium prices and subsidies may be advisable; (3) that defense authorities should immediately decide this question so that, if necessary, legisla-

tion can be obtained to authorize production incentives in this session of Congress."

More than 150 registrants plus their ladies all had a thoroughly enjoyable time meeting with old friends and making new ones in the pleasant atmosphere so characteristic of Sun Valley. It is certain that those who had the privilege of attending this year's convention of the Idaho Mining Association will be anxious to return again in future years.

Utah Fuel to Test Colorado Coal Beds

A statement in error appeared in the May issue of MINING CONGRESS JOURNAL to the effect that the Utah Fuel Co. would develop an estimated 100,000,000 tons of coking coal in the Coal Creek district of Gunnison County, Colo. It was further misstated that a \$5,000,000 program would begin this year.

Actually the Utah Fuel Co. has obtained a prospecting permit on Government coal-bearing land near the head of Coal Creek in Gunnison County, Colo., and is now undertaking some diamond drilling to determine the existence, quality, and possible workability of underlying coal beds in that vicinity. This exploration work is several miles removed from the drilling done over the past few years by the Bureau of Mines, as reported in Department of Interior Report of Investigation No. 4104.

Sheldon-Superior Group in Production

The 50-ton flotation plant of the Western Mining and Engineering Co. completed in the middle of June has begun milling operations. Western Mining and Engineering acquired the old Sheldon-Superior group of claims, 14 miles south of Prescott, Ariz., about a year ago. A considerable tonnage of copper-lead-zinc ore has been developed. Charles Bollar, of Prescott, is president and manager.

Green Mountain Pushing Work

The Green Mountain gold property near Dixon, Mont., has shipped \$20,194 worth of ore to the Anaconda smelter since January, according to E. F. Elstone, engineer in charge. Another carload of concentrates has been shipped. The \$20,000 RFC development loan has been whittled down to \$5,079 by 15 per cent repayments on net smelter returns. The company operated at a small profit during the winter in spite of freezing conditions. New development work is expected to open enough stoping ground to operate their milling plant at full capacity.



Idaho Mining Association members and guests pose after the opening session in Barney Haffner's "Opera House Stope"



BUILDING MATERIALS PRICE CLIMB 1939-1947

Steel Price Increases Less Than 1/3 The Average on All Building Materials Prices

Why the sky-high home building costs? The joint Congressional Committee on Housing has been seeking the answer to this question for some time.

To help the Committee find the answer, the Bureau of Labor Statistics compiled figures on the increases in prices on all building materials from August, 1939, to October, 1947.

The chart above is based on these figures. They prove again our oft repeated contention that Steel IS Cheap.

It is noteworthy that price increases on structural steel are the lowest of all building materials except cement and less than a third of the average advance on all building materials.

Or, take another steel item important in home building—nails. The increase in the across the counter price of nails adds only about \$15.00 to the cost of a G. I. home as against the price 10 years ago.

Steel IS Cheap!

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Montana Plans Summer Convention

On July 30 and 31, members of the Mining Association of Montana will convene at Virginia City, Mont., for their tenth summer convention. Many excellent speakers are scheduled on the program. It is expected that Ross D. Leisk, manager of the Sunshine Mining Co., will speak on the "Future of Silver," and that Francis A. Thomson, president, Montana School of Mines, and director, Montana Bureau of Mines and Geology, will also be among the speakers. Fine entertainment will be included in the program and the historic surroundings of Virginia City should ring with new life when the miners gather there. One of the features of the meeting will be a pageant depicting the activities of the Vigilantes and the men they brought to justice. At least two hangings will be held and nominations are open for victims.

Colorado Shale Oil Shipped

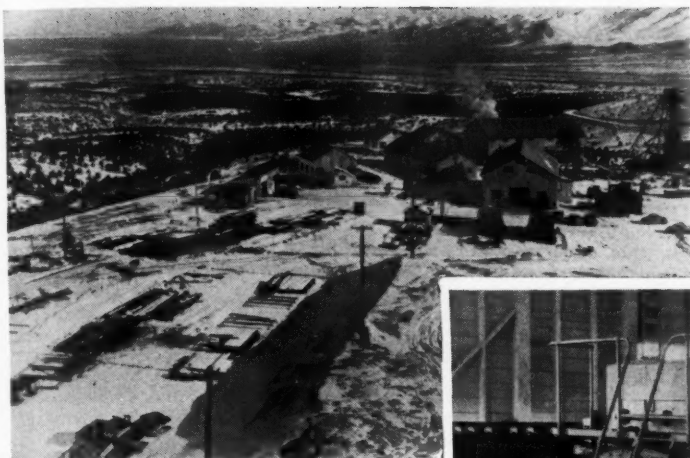
The Bureau of Mines announced the first bulk shipment of oil from Colorado shale on June 4. The bureau said 6369 gallons of crude shale oil were shipped from its Rifle, Colo., demonstration plant to the Universal Oil Products Co. laboratory at Riverside, Ill. After separation into grades of crude oil, cracking and refining studies will be conducted at the California laboratories of the Union Oil Co.

Separation of Monazite Sands

The University of Idaho college of engineering and school of mines is conducting a series of experiments dealing with the chemical separation and purification of the rare earth metals from Idaho monazite sands, using ion-exchange methods under the direction of L. A. Jobe, head of the chemical engineering department.

"Deposits of monazite sands in Idaho are very extensive," says Dean Allen S. Jansen, of the engineering department, in discussing this special research undertaking, "Professor W. W. Staley, of the school of mines, estimates there are in Idaho and Boise Counties alone 200,000,000 cu yds of gravel which probably contain 0.2 to 0.3 per cent monazite," he said. About 56,000,000 cu yds of this gravel have been dredged for gold and the monazite and associated sands dumped back into the streams. The gold value of these deposits runs 25¢ a yard, as compared to 75¢ a yard for the monazite at current eastern prices."

High freight rates preclude the use of the Idaho deposits, hence the object of the present research is to determine a method whereby the sands can be economically concentrated to a commercial product.



Surface plant of the Eureka Corporation, Ltd., Eureka, Nev.

One of three 1000 kw Diesels that will provide power for unwatering the Fad shaft

Fad Shaft Recovery Progress

By May 21, pumping at the Fad shaft had lowered the water to the third level, 1200 ft before the collar or approximately 200 ft below the elevation at which the water leveled off at the shaft. A temporary pump setup will be made at the third level and additional Diesel-power units, electric cables, and pump columns are being set up prior to lowering two more Byron-Jackson pumps to recover the fourth level at 1684 ft. When the fourth level has been recovered the pump station space will be enlarged and operations will go forward to recovering the sixth level. Pumping in the shaft is being done with 350 hp submersible deep-well pumps each 2000 gpm capacity. Station pumps



are two-stage 3500 rpm horizontal type with electric drives varying from 200 to 450 hp. Final installation plan will include 18 station pumps and three submersible deep well pumps. The manager of the Eureka Corpora-

tion, Ltd., at Eureka, Nev., anticipates recovery of the sixth level station in the latter part of July or early in August if work schedules can be maintained and no unforeseen difficulties occur.

New Mexico Mines Scholarship

Scholarship awards were made June 10 by the New Mexico School of Mines by Dr. William G. Camp, Director of Instruction. The \$750 annual Kennecott Copper Corporation scholarship went to Ray W. Ballmer, of Santa Rita, N. M. The \$500 American Smelting & Refining Co. scholarship was awarded to Richard C. Anderson of Belen, N. M. The faculty scholarship was given to John Aumen, of Braintree, Mass., and two Regents' scholarships went to Milton Barber, Santa Rita, N. M., and Alan Cheetham, Taos, N. M.

Custom Mill for Kingman

V. H. Hazen and W. J. Howard, of Kingman, Ariz., have announced their plans for the erection of a 250-ton custom mill in or near Kingman and state that if conditions warrant they will install a second mill of equal capacity. They are seeking a suitable site and water supply for the mill

and are surveying the field to find out approximately the amount and kind of ore they will be called on to handle when the plant is put into operation. They expect to have their own fleet of trucks so that they can pick up the ore at the mine, haul it to the mill, sample it, then give the miner payment immediately. Hazen and Howard at present are working the Golden Gem mine in the Cerbat district.

Livingston Mine to Reopen

The old Livingston silver-lead mine in Custer County, Idaho, about 62 miles from the town of Mackay, is being reopened under the management of T. S. Mackay, formerly with the American Smelting & Refining Co., and assistant manager of the Big Bell mine in western Australia. The operators plan the construction of a 200-ton milling plant. The high grade ores produced in present development are being shipped to Salt Lake City smelters.

Washington Safety Standards Revised

Revised safety standards for most of the Washington mining industry became effective recently. The new standards applying to all metallic and nonmetallic mines, except coal mines which are covered by a separate safety code. As Earl N. Andreson, the state director of labor and industries at Olympia, Wash., pointed out, the new standards contain many changes in equipment and work-method requirements which are designed to reduce industrial accidents due to mechanical hazards and human failure.

New Tungsten Company Formed

Capitalized at \$500,000, the Tungsten Mining & Milling Co. has recently been incorporated at Spokane, Wash., by the following: Theodore W. Liepold, Albert L. Ray, and H. C. Cooper.

Coronado Plans Exploration

The Coronado Copper and Zinc Co. has acquired the Landsman property, 13 miles northeast of Klondyke, Ariz., and plans to launch a diamond drilling exploration program at an early date. The Landsman claims were located by Frank Landsman, old-time prospector, who optioned them two years ago to the Byrd Investment Company. The latter organization made regular shipments of lead-zinc ore from the claims until the termination of the Premium Price Plan.

At Coronado's main operation, the Republic and Mammoth mines near Dragoon, more than 6000 tons of copper-zinc ore are being mined and milled monthly. This work is conducted on a three-shift basis with approximately 125 men employed. A. W. Heuck, Dragoon, is manager and superintendent, and Roy W. Moore, of Los Angeles, is president and general manager.

New Mexico Miners Annual Meeting

The 1949 annual meeting of the New Mexico Miners and Prospectors Association will be held at Santa Fe, N. M., on February 11 and 12, according to an announcement made by Jack C. Pierce, executive secretary.

Climax Molybdenum May Extend Activities

At a special stockholders meeting of the Climax Molybdenum Corp. an amendment was added to the certificate of incorporation to permit the company to extend its mining activities to other than molybdenum.

The company now can engage in the mining of other metals and minerals, including petroleum and gas. Arthur D. Storke, president, informed stockholders there is no arrangement pending for Climax to enter petroleum producing industry.

Bunker Hill Goes Deep

Further development of the Bunker Hill & Sullivan Mine, Kellogg, Idaho, will carry the workings to a depth of 1600 ft below sea level, according to recent reports. For a long time the neighboring Sunshine Mine has held the deep mine record in the district with workings extending to 1000 ft below sea level.

Shaft development begun in 1943 and continued through 1945 included the expenditure of more than \$800,000 for the purchase and installation of new equipment. A new Nordberg hoist will service the shaft for an additional 1200 ft.

It has been reported that plans call for increasing the daily output from 1300 to 1500 tons.

Diesel Haulage

The Triumph Mine at Hailey, Idaho, is trying out the experiment of installing Diesel locomotives for underground haulage, according to George McDowell, state mine inspector, who states that all safety regulations have been taken care of and will be carefully checked. If the operation is successful the Nabob mine on Pine Creek, in the Coeur d'Alene district, will install a similar system. The U. S. Bureau of Mines, says McDowell, contends that Diesel underground haulage, when properly installed, is safer and cheaper than trolleys or battery-operated trammer systems.

Wheels of Government

(Continued from page 56)

lic nuisance. The U. S. Surgeon General is authorized to recommend remedial measures to State agencies, and upon second notice he may recommend to such agencies that suit be initiated to abate the pollution. If action is not then taken the Federal Security Administrator is authorized to conduct public hearings before a Board and if the recommendations of the Board for pollution abatement are not followed, the Administrator, provided he obtains the consent of the State agency, may request the Attorney General to bring suit. In any such suit the Court must give due consideration to the practicability and to the physical and economic feasibility of securing abatement of any pollution proved.

Authorization is made for loans to State, municipality or interstate agencies for construction of treatment works, in the amount of \$22,500,000 annually. Long active in behalf of water pollution legislation, Representative Brent Spence (Dem., Ky.), following a conference at the White House, stated that the Taft-Barkley bill, "is a start on a solution to a very serious problem" and that "this is the first piece of Federal legislation dealing with water pollution. I think we can improve upon it through amendments later on."

Coal Contract Made

The bituminous coal mine joint wage conference reached agreement on June 25, thus ending the negotiations begun on May 18. The contract runs for a year to June 30, 1949, subject to reopening on 30 days' notice by either party. Provided is a \$1 a day increase in the wage, which brings the underground day wage scale to \$14.05, and an increase in the Welfare

Magma Cooling Plant

More than \$1,000,000 is being spent by the Magma Copper Co., Superior, Ariz., for constructing and installing additional ventilation and air conditioning systems. The new refrigeration units are powered by 200-hp motors. High-speed fans circulate hot mine air through the cooling coils of the refrigeration units. Two lines are being installed in the mine, one to carry cool water 4800 ft down into the mine and the other to return the heated water to the surface.

On the surface, a cooling tower about four stories high will reduce the temperature of the heated water coming from the mine. The cooled water will be returned to refrigeration units located at different levels in the mine. The new units will cool 25,000 cu ft of air per minute.

Fund payment by the operators from the present 10c to a new rate of 20c per ton mined. The operators of many captive mines have not agreed to the settlement, maintaining that the union-shop provided in the contract is a violation of the Taft-Hartley Act.

The rocky road to the agreement reached June 25 was marked by court decisions and the invoking of the power of the Taft-Hartley Act. First the appeal of the Southern Coal Producers Association through the NLRB, that the UMWA be directed to bargain collectively with the Association through its president, Joseph E. Moody, was sustained by Justice Goldsborough of the Federal District Court. The miners then returned to the joint negotiations, with John Lewis insisting that the 1947 UMWA Welfare and Retirement Fund be activated immediately, with disbursement from the fund subject to the majority decision of two of the three trustees.

A court order urged by Ezra Van Horn to block payment of pensions on the above basis was dismissed by Judge Goldsborough on June 22. The court ruled that the \$45,000,000 1947 welfare fund is a "beneficial fund" subject to rules applying to public charities, and meaning that only a majority vote of the trustees is needed to make disbursements from the fund. It was also held that UMWA members who are no longer employed by the operators signatory to the 1947 agreement, are also eligible for the monthly pensions.

This court action broke the deadlock and, although the controversy over the making of a contract had gone so far that President Truman had established a Taft-Hartley Board of Inquiry, the warring miners and operators were able to get together. Without further action by the Board of Inquiry or the President, the contract was made.

Colorado Feldspar

The Consolidated Feldspar Corp. has been handling 1000 tons of feldspar ore a day and employing 100 men since 1947 at its Parkdale plant near Canon City, Colo. Mining is by open cut and ore is handled by power equipment. A fleet of 15 10-ton trucks haul the ore six miles to the mill where a high grade feldspar concentrate is made by froth flotation. Pure concentrates of quartz and mica are also made and sold as a by-product. More than 85 per cent of the ore is utilized. Principal markets for the feldspar are the glass, porcelain, and pottery industries. A unit is being installed to grind the product to a fineness suitable for the scouring-powder trade. The Colorado feldspar deposits are extensive.

Polaris Completes Shaft

Polaris Mining Co. is the first, other than Sunshine, to complete sinking a shaft and discovering a new body of high grade ore in the silver belt, ahead of three other shaft developments headed for the same horizon. Polaris not only completed sinking its Silver Summit shaft but, according to the company's annual 1947 report, "finished cutting the 3000 station and sump, 3020 ft of crosscutting, 898 ft of drifting, and 610 ft of diamond drilling was accomplished."

Polaris owns 52.56 per cent of the outstanding Silver-Summit stock and has an option of an additional 292,614 shares of the stock. The Hecla Mining Co. controls Polaris.

The company is also driving a long crosscut north from the shaft to open the Chester vein, in which Sunshine Mining Co., operating in ownership with Polaris, Silver Dollar, and Silver Syndicate mining companies, has developed two exceptionally large and rich veins of silver-copper-antimony and silver-lead ores, which are now in heavy production.

Kay Mine to Start Producing

W. J. Forbach, of Superior, Ariz., and associates, are unwatering the Kay mine to the 600-ft level and within the next 30 days expect to start mining. After further examination milling facilities may be provided.

The Kay is located on the Agua Fria River, in the Black Canyon District, about 50 miles north of Phoenix. A vertical shaft has been sunk to the 1500-ft level and about 15,000 ft of drifts, tunnels, and crosscuts have been driven. Estimates of ore reserves include 70,000 tons of 5.1 per cent copper, and probably 100,000 tons averaging 3.57 per cent.

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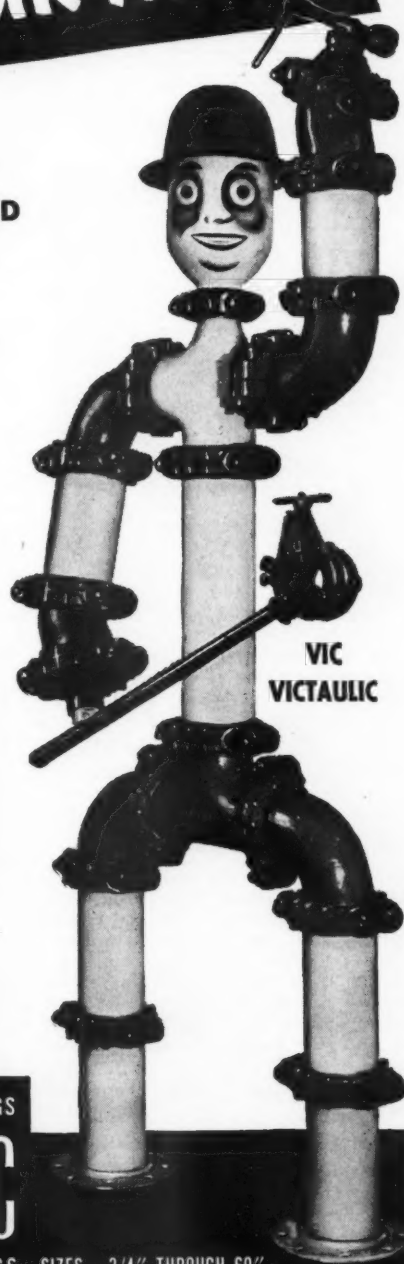
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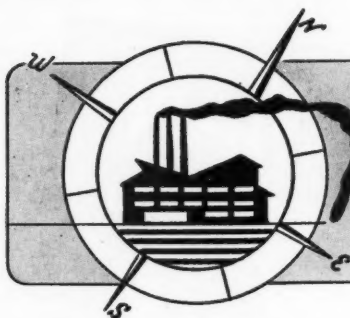
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Manufacturers Forum

Mine Vent Repair Kit

The American Brattice Cloth Corp., Warsaw, Ind., has available a repair kit for making minor repairs to its tubing, such as holes made by flying



fragments of rock, rips, and tears. Altogether in a handy carrying case, the mine-vent repair kit contains a pint can of adhesive cement, specially developed for mine-vent vinyl plastic coated tubing, a brush, and four yards of six-inch wide mine vent cloth for patches.

Fire Proof Trolley Guard

In addition to its being fire-proof, the B. F. Goodrich Co., Akron, Ohio, claims that their new Koroseal trolley guard for mines is resistant to acids, fumes, mildew, and mine damp and hangs better than conventional trolley guards because of heavier, reinforced edges and center. The heavier edges of the new guard are said to hang more naturally and offer greater protection to miners from the high-voltage wires.

Emergency Belt Control

Mines Equipment Co., St. Louis, Mo., recently announced availability of sectionalized emergency belt control for underground or slope belts. The control consists of a system of plugs located at intervals along the belt to form a circuit wired in series with the belt motor control. In the event of a roof or timber fall the circuit is broken and the movement of the belt is stopped. The belt cannot be started again until the cause

of the circuit interruption is checked and cleared. The belt may be stopped in an emergency by disconnecting any one of the plugs located along the belt. Units are now available for belts 600, 1200, 1800 and 2400 ft long.

Portable Shot Firer

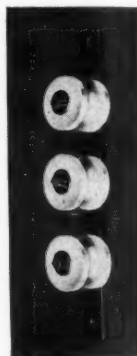
A light-weight ten-shot firer which can be carried on the operator's belt is being produced by Farmers Engineering & Manufacturing Co., Pittsburgh, Pa. The unit weighs slightly over one pound and is provided with a belt hook so that it may be carried by the person responsible for firing.



Shots may be fired without removing the shot firer from the belt. Sufficient charge to detonate one to ten shots is transferred to two condensers and then to the explosive by use of a special safety key. A device is included to automatically dissipate the charge if not used. Provided with recessed terminals, the unit is in a non-metallic, non-conducting case, and a neon light indicates when it is ready to fire. This shot firer meets U. S. Bureau of Mines requirements.

Insulated Feeder Rack

Offering greater ease in stringing cables, a new feeder rack has recently been announced by the Ohio Brass Co., Mansfield, Ohio. Three 1,000,000 cir mils cables can be held in the new rack, one above the other. The insulators are mounted on steel studs welded to a two-inch steel channel. The clearance between the outer rims of the insulators will accommodate cables having an outside diameter of 1.75 in. The new rack is completely open on one side, hence eliminates threading the cable through a closed eye or disassembling the rack.



Light-Weight Fire Extinguisher

Announcing a complete new line of 2½ gal resistance-welded, silicon-bronze fire extinguishers, The American-LaFrance-Foamite Corp., Elmira, N. Y., claims them to be much stronger and 4½ lb lighter than the older type riveted and copper fabricated units of the same capacity. The new construction, in addition to offering lighter weight, provides greater resistance to accidental blows.

Separable Fastener for Conveyor Belts

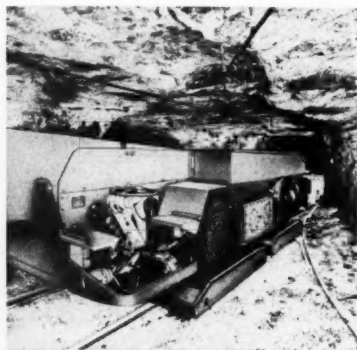
The Flexible Steel Lacing Co., Chicago 44, Ill., has announced a new type of separable conveyor belt fastener called the Hinged Flexco Belt Fastener. Consisting of a series of U-shaped galvanized plates bolted to each end of the belt and joined together with a flexible hinge pin, the new fastener is said to stand a pull from 18,000 to 22,000 lb on a new 30-in. belt. The new fastener was particularly designed for use in underground extension conveyors in coal mines and has been field tested for nearly two years.

Rubber-Tired Dozer

For heavy-duty earth moving, R. G. LeTourneau, Inc., Peoria, Ill., is producing a 25-ton, 300-hp, four-wheeled, rubber-tired dozer. The new rig comes with electrically operated blade control and a transmission which eliminates shifting gears. Four 24 by 29-in. tapered-bead tires afford a wide contact surface with the ground.

Shuttle Car Transport

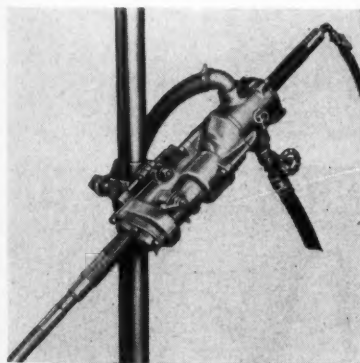
For the transportation of shuttle cars to and from work areas in mines, the Phillips Mine & Mill Supply Co.,



Pittsburgh, Pa., offers a shuttle car carrier requiring 5½-in. head room with an over-all width of 89 in. The unit can be built to fit any track gauge and any model of shuttle car.

Universal Diamond Drill

As a companion machine to CP No. 5, the Chicago Pneumatic Tool Co., New York, N. Y., has announced a CP No. 55. It is designed for



universal use for core drilling, blast hole, and grouthole drilling. The new rotary air motor developed for this machine has the same weight as the No. 5 motor but is said to develop 25 per cent more power. Good balance for easier handling is claimed

for this new diamond drill, which is said to drill more footage at less cost than any previous model.

Solenoid Air Valve

A four-way solenoid air valve for the control of double acting cylinders is available from Mechanical Air Controls, Inc., Detroit 2, Mich. The manufacturer claims fast reversal, long service, and simple maintenance for the direct solenoid control unit. Valve control utilizes 2.4 amp at 220 v.

Conveyor for Fluid Materials

A new ribbed-top conveyor belt designed to prevent backslip in carrying sand and gravel, wet-mixed concrete, gold dredgings and high density bulks up steep inclines, has been developed by Goodyear Tire and Rubber Co. Chevron-shaped ribs one-quarter inch higher than the belt surface serve to trapping water and preventing conveyed materials from sliding back down the belt. Company engineers claim that the ribbed belt eliminates any noticeable back-slipping of most wet materials on inclines up to a 20-deg angle. In addition the ribbed cleats are said to increase belt life substantially by reducing the severe wear on the belt caused by the back-slipping of loads.

CATALOGS AND BULLETINS

COAL CLEANING. McNally-Pittsburg Manufacturing Corp., Pittsburg, Kans. Information on four coal cleaning systems with explanatory circuits, illustrations of machines, and diagrams of operation are packed into a new 20-page booklet published by the McNally-Pittsburg Mfg. Corp. Designated as McNally-Pittsburg Coal Cleaning Bulletin 216. Copies will be sent upon request.

ELECTRIC CABLE VULCANIZERS. Mines Equipment Co., St. Louis, Mo. Two new bulletins are now available without charge covering the equipment and methods used in vulcanizing electrical cables. One bulletin is entirely devoted to prices of the company's molded rubber connectors and receptacles.

REPAIRING WORN TREADS. Stultz-Sickles Co., Newark 5, N. J. For regrouing worn-down tractor treads, this concern offers special shaped Manganal applicator bars. All shapes and sizes are available for repairing the treads of tractors produced by various manufacturers. Detailed information on the method of repairing worn-down grouser is available on application to the company.

SPIRAL CONVEYOR. Jeffrey Manufacturing Co., Columbus 16, Ohio. A 47-page, complete and up-to-date catalog covering the application, specifications, and other details pertaining to spiral conveyors is available on request. Spiral conveyors have a diversified application throughout the industry and can handle almost any type of evenly-sized material. Three principal classifications of spiral conveyors are available according to the capacity required.

— Announcements —

Herman H. Pancake has been appointed manager of the American Car and Foundry Co.'s newly-created mine car and special products sales division, a consolidation of the mine-car sales and miscellaneous-sales division. Mr. Pancake's increased jurisdiction came upon the retirement of H. D. Distelhurst after 43 years of service with the company.

John T. Ryan, Jr., has been elected executive vice-president of Mine Safety Appliances Co., Pittsburgh, Pa., according to a recent announcement by George H. Dieke, president. Mr. Ryan was formerly general manager of the company.

William L. Chambers, Kenneth Twombly, and Conrad R. Seim, have joined the staff of Kennametal Inc., Latrobe, Pa., as application engineers, working out of the Chicago office. Gerald Transue will work out of the Philadelphia office and Ralph Pearce out of the Pittsburgh office.

John W. Bishop has been appointed as sales representative of the Marion Power Shovel Co. of Marion, Ohio, in the territory covering southern Indiana, western Kentucky, and south-eastern Illinois. A. William McGraw has been appointed representative in sections of Missouri, Illinois and Kentucky.

Mervyn W. Martin is now sales representative in California and Nevada.

Lee Llewellyn has become associated with Roberts and Schaefer Co., as their representative in the Pennsylvania, Ohio and northern West Virginia fields. He has had many years of experience in engineering and sales of coal preparation plants.

Mr. Llewellyn will make his headquarters at 2801 Broadway Avenue, Pittsburgh 16, Pa.

D. R. Anderson is now manager of the Euclid Road Machinery Co. in Hibbing, Minn. He was formerly service manager for the company. J. M. Fairbanks has been appointed to succeed Mr. Anderson.

Louis W. Huber has been elected vice-president of the National Mine Service Co., in charge of all the firm's divisions and operations in Kentucky, Tennessee, Illinois, and Indiana.

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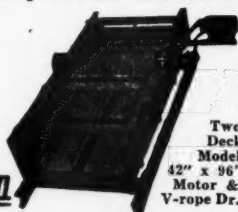
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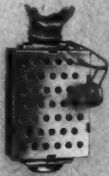
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